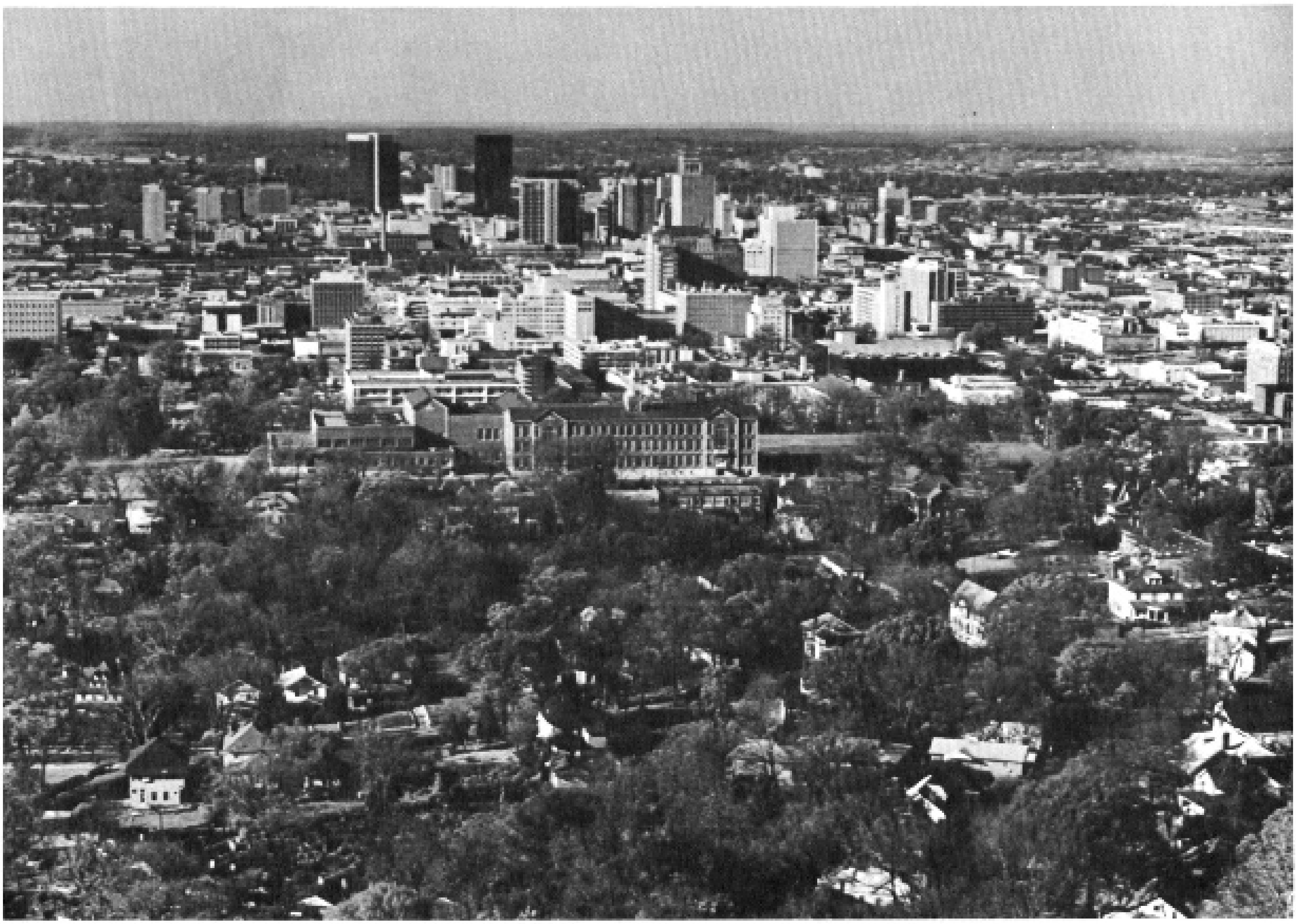
Soil survey of

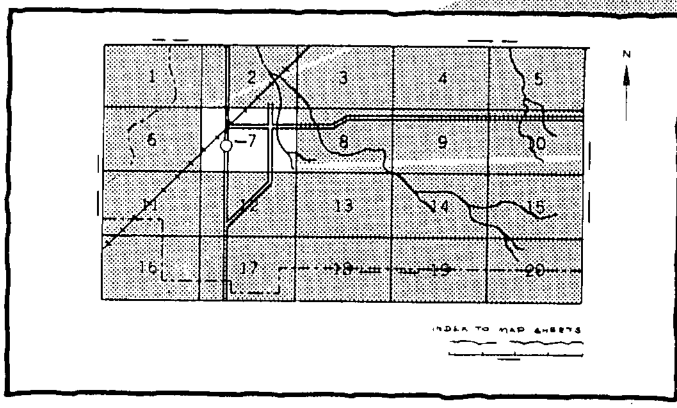
Jefferson County, Alabama

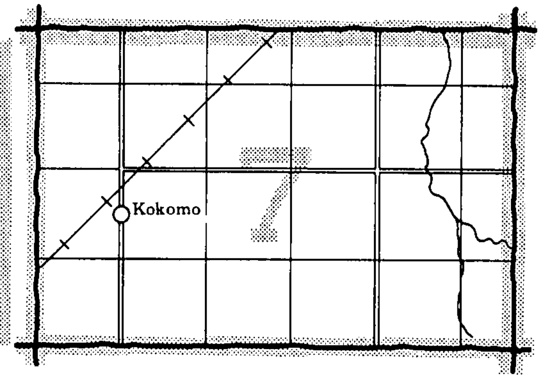


United States Department of Agriculture, Soil Conservation Service
in cooperation with
Alabama Agricultural Experiment Station
Alabama Department of Agriculture and Industries
Alabama Surface Mining Reclamation Commission
United States Department of the Interior, Bureau of Land Management

HOW TO USE

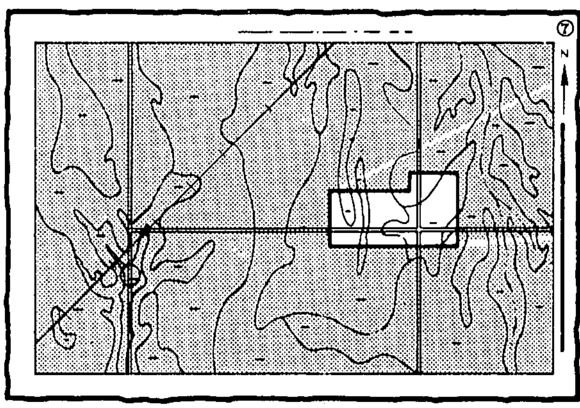
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).

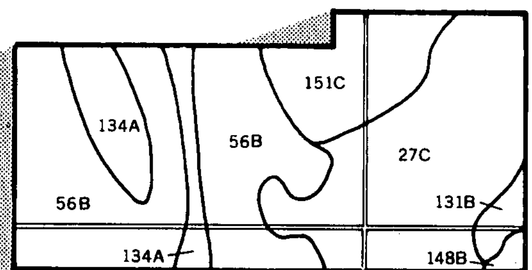




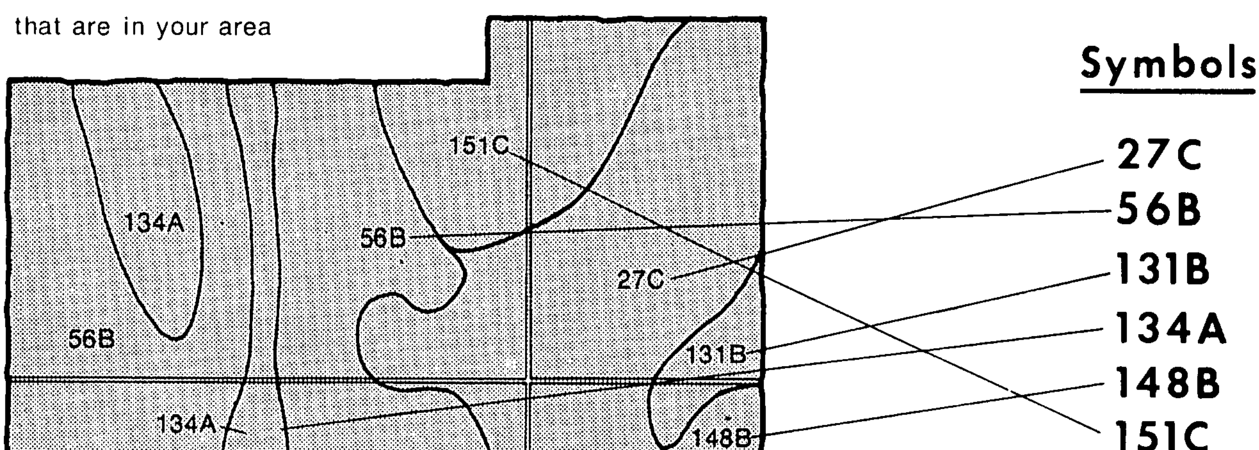
2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



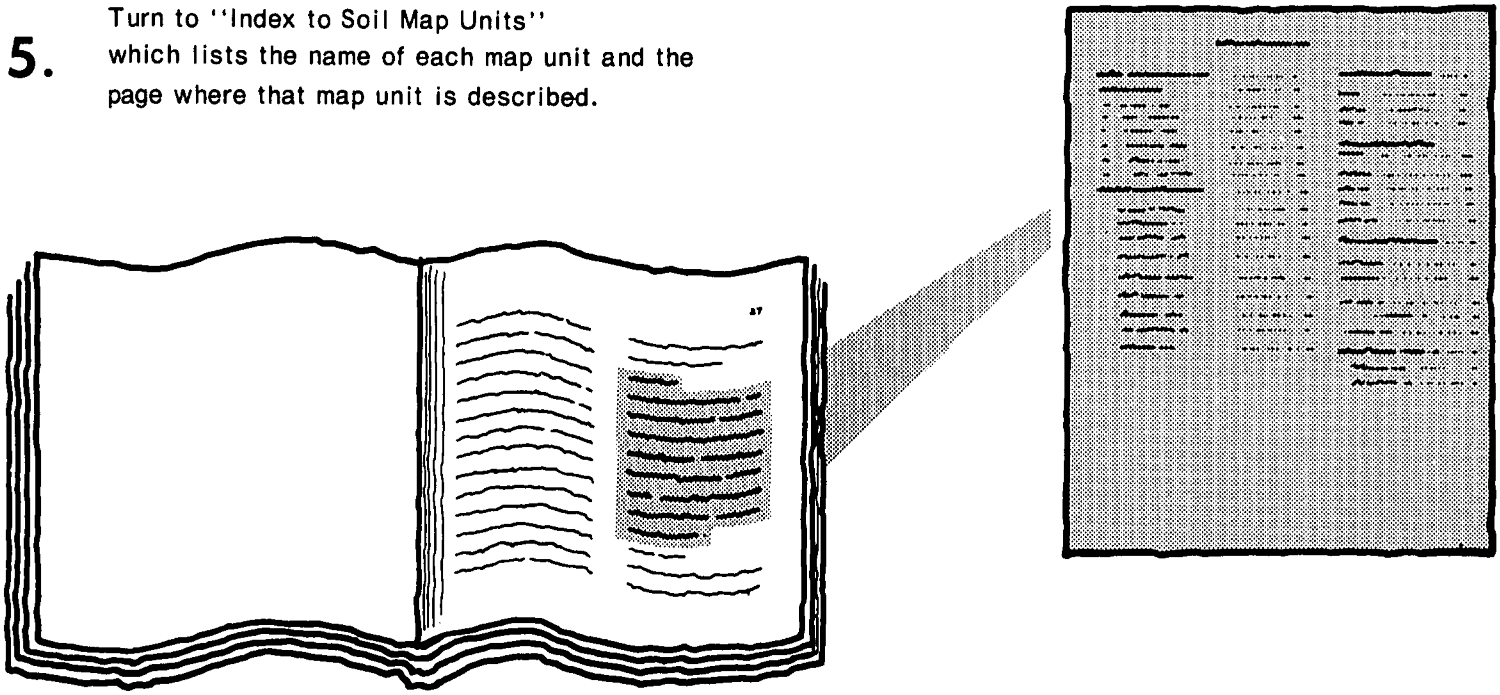


4. List the map unit symbols that are in your area

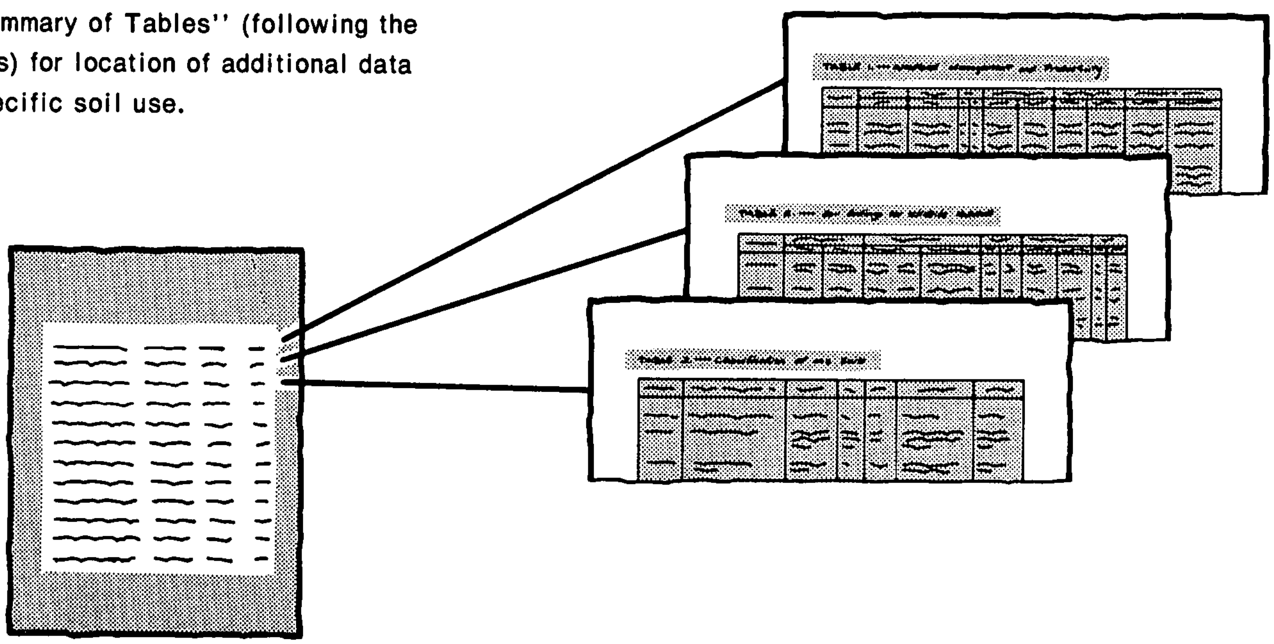


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1970-80. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, the Alabama Agricultural Experiment Station, the Alabama Department of Agriculture and Industries, the Alabama Surface Mining Reclamation Commission, and the United States Department of the Interior, Bureau of Land Management. It is part of the technical assistance furnished to the Jefferson County Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Central business district of the city of Birmingham. About one-fifth of the total land area in Jefferson County is in urban use.

contents

soil series

Issued August 1982

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summary of tables

foreword

This soil survey contains information that can be used in land-planning programs in Jefferson County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

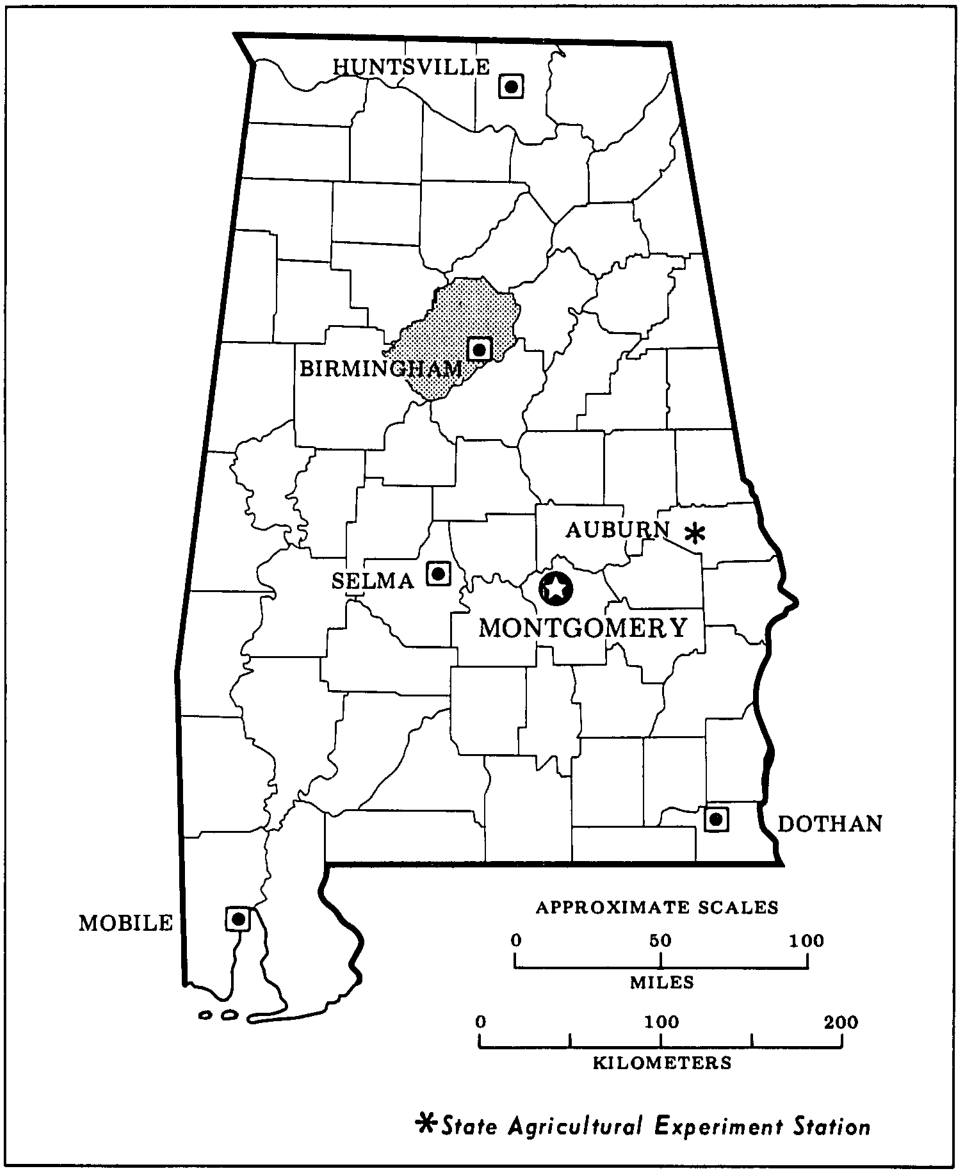
This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Slowly permeable or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Ernest V Todd

Ernest V. Todd
State Conservationist
Soil Conservation Service



Location of Jefferson County in Alabama.

soil survey of
Jefferson County, Alabama

By Lawson D. Spivey, Jr., Soil Conservation Service

Soils surveyed by Joe L. Berry, William H. Kelley, David E. Lewis, Lawson D. Spivey, Jr.
Cleo Stubbs, and Harold B. Neal, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with the Alabama Agricultural Experiment Station
the Alabama Department of Agriculture and Industries
the Alabama Surface Mining Reclamation Commission, and
the United States Department of the Interior, Bureau of Land Management

JEFFERSON COUNTY is in central Alabama. It has a land area of 713,600 acres, or about 1,115 square miles. The city of Birmingham, which is an important center of trade and industry in the southeast, is the county seat. In 1970 the population of the county was about 645,000 (*11*).

Soil scientists determined that there are about 21 different kinds of soil in Jefferson County. The soils range widely in slope, depth to rock, permeability, and other characteristics. Consequently, there is a wide variation in soil suitability for most types of land use.

An older soil survey of Jefferson County was published in 1910 (*12*). The present survey has more information for use of the soils and provides more detail of map units.

general nature of the county

History and land use, climate, and geology are briefly described in this section.

history and land use

Settlers of Jefferson County came mainly from Tennessee in about 1813 and established homes in the Jones Valley area (*4, 5*). Most of the native Indians had moved west by 1840. During most of the 1800's, Jefferson County was an agricultural area, mainly in Jones Valley. Cotton was the primary cash crop. By the end of the century, the use of fertilizer was gaining acceptance and market gardening was growing in importance (*12*).

During the late 1800's, mining of coal and iron led to the establishment and rapid growth of Birmingham (*7*). In early 1900, most of the original agricultural area in and around Jones Valley was converted to industrial and residential uses. During the past 25 years, surface mining has changed land use in many parts of the county.

The three contrasting land uses in Jefferson County are urban, woodland and surface mining of coal, and agriculture.

The large metropolitan area of Birmingham and surrounding cities is in the southeastern third of the county. In this area, existing open areas are rapidly converted into industrial, commercial, residential, and recreational uses. Most of the well suited soils for building in this area have already been developed. The most recent developments are located mainly on soils that require special planning and engineering for urban uses.

Most of the land in the northwestern two-thirds of the county is used for woodland and surface mining of coal. Most of this area has been mined or is being mined for coal.

The third land use of the county is agriculture. The most significant agricultural areas are in the valleys south and west of Bessemer. Beef and dairy cattle are prominent here. Soils on the plateau near Corner are

used mostly for field and vegetable crops. A large, irregular shaped agricultural area is along the metropolitan fringe, and it has numerous scattered beef cattle operations. Low density residential areas are along most of the roads in the agricultural areas.

climate

Prepared by the National Climatic Center, Asheville, N.C.

In Jefferson County, summers are hot in valleys and slightly cooler in the hills; winters are moderately cold. Rains are fairly heavy and generally well distributed throughout the year. However, there are droughty periods during the growing season of most years. Nearly every winter, the snow cover lasts only a few days.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Birmingham, Ala., in the period 1951 to 1978. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 45° F, and the average daily minimum temperature is 35°. The lowest temperature on record, which occurred at Birmingham on January 30, 1966, is -4°. In summer the average temperature is 79°, and the average daily maximum temperature is 89°. The highest recorded temperature, which occurred on July 25, 1952, is 106°.

Growing degree days are shown in table 4. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 54 inches. Of this, 26 inches, or about 50 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 22 inches. The heaviest 1-day rainfall during the period of record was 6.9 inches at Birmingham on March 19, 1970. Thunderstorms occur on about 60 days each year, and most occur in summer.

Average seasonal snowfall is 1 inch. The greatest snow depth at any one time during the period of record was 8 inches.

The average relative humidity in midafternoon is about 85 percent. Humidity is higher at night, and the average at dawn is about 60 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 9 miles per hour, in winter.

geology

Denny N. Bearce, associate professor of earth science, University of Alabama, Birmingham, helped prepare this section.

Jefferson County is in the Appalachian Highlands major physical division of the United States. Further, the southeastern part of the county is in the Tennessee section of the Valley and Ridge province, and the northwestern part of the county is in the Cumberland Plateau section of the Appalachian Plateaus province.

The county mostly is underlain by sedimentary bedrocks that are 300 to 600 million years of age (*9*). However, much younger Quaternary alluvium underlies the flood plains and terraces in the valleys.

The Valley and Ridge province has sedimentary bedrocks that have been deformed by folding and faulting. Horizontal compression of the bedrocks produced a series of major folds, called anticlines and synclines. These folds were broken by major shear fractures, called thrust faults, causing portions of the folds to be displaced northwestward for several miles. This period of folding and faulting was more than 200 million years ago. Subsequently, the region was elevated and subjected to geologic erosion for more than 200 million years. During this period, tilted edges of the folded strata were exposed to erosion. A series of long, narrow parallel valleys and ridges developed. The ridges have bedrocks that are more resistant to erosion than material in the valleys. The valleys and ridges are oriented in a northeast-southwest direction.

Generally, the oldest bedrocks are exposed along the central portions of anticlines, which are elongate folds in which the strata have been arched upward and subsequently carved away by stream erosion, and at the leading edges of thrust sheets, which are faulted rock strata that have been transported upward as well as northwestward. The youngest rock strata are exposed in the central portions of synclines, which are elongate, trough-like folds in which rock strata have been warped downward and thus protected from geologic erosion relative to adjoining anticlines.

In the Valley and Ridge province, the Birmingham Valley runs the length of Jefferson County. It is bordered on the northwest by Sand Mountain and Rock Mountain and on the southeast by Shades Mountain and Little Shades Mountain. Birmingham Valley includes lesser valleys and ridges such as Opossum Valley, Flint Ridge, Jones Valley, Red Mountain, and Shades Valley. Rock strata exposed in the Birmingham Valley are many and variable. The broadest exposures include the Conasauga Formation (limestone, dolomite, and shale), Ketona Dolomite, the Knox Group of limestones and dolomites,

Chickamauga Limestone, Red Mountain Formation (siltstone, iron ore beds, and limestone), Bangor Limestone, Floyd Shale, and the Parkwood Formation (sandstone and shale).

Several narrow exposures of other formations exist that are composed of limestone, chert, sandstone, and shale.

The Cahaba Valley in eastern Jefferson County is drained by the Cahaba River and is separated from Birmingham Valley by Shades Mountain, Little Shades Mountain, and some lesser ridges known as Cahaba Ridges. It is bordered on the southeast by Oak Mountain. Rock strata exposed in the Cahaba Valley include the Rome Formation (mostly shale), Ketona Dolomite, the Knox Group of limestones and dolomites, a series of middle and late Ordovician limestones and shales, Fort Payne Chert, Hartselle Sandstone, Floyd Shale, and the Pottsville Formation (sandstone, shale, and coal).

The Cumberland Plateau section is underlain by horizontal sedimentary bedrock layers that are deeply dissected by streams. The land form consists of low hills in an irregular pattern. These hills have broad, gently rolling summits and steep slopes. Relief is on the order of 200 to 250 feet. The hills are generally capped with massive beds of sandstone. The rock strata are mostly of the Pennsylvanian Age Pottsville Formation. This Formation consists of alternating beds of sandstone and shale with numerous coal seams and associated underclays. Sandstones are quartzose and pebbly, or conglomeratic, or clayey and contain rock fragments. Shales are generally siltstones that are highly fractured because of hydration and expansion of clay minerals during weathering.

Soil suitability for various uses is normally based on evaluations of properties within the soil alone. Interpretations in this soil survey are made as to what effect these properties could have on use. There are many geologic features that are not expressed within the soil but that may significantly affect the suitability of a site for a particular use. Individual sites should be evaluated by onsite examination and testing. In many cases, special planning, design, and construction techniques can be used to overcome geologic problems where they are identified and evaluated.

how this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

general soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The Jefferson County general soil map units vary widely in their suitability for major land uses. They have been combined into four groups that have similar landscape features and similar suitability to general classes of land use. In table 4, the four groups of map units are listed and a general statement of suitability is given for eight categories of land use. Also included are some favorable as well as restrictive characteristics.

Descriptions of the general soil map units follow.

Undulating to hilly soils on plateaus, mountains, and ridges

The four general soil map units in this group make up about 25 percent of the county. This group consists of soils that generally have good to fair suitability for urban, farming, and woodland uses.

1. Nauvoo-Townley-Montevallo

Well drained soils that are moderately and slowly permeable; formed in residuum from sandstone, siltstone, and shale

These soils are on plateaus and ridges throughout the county, but they are mainly in the northwestern half of the county. These landforms are slightly to moderately dissected by drainageways and small streams and are fairly uniform in relief.

This map unit makes up about 14 percent of the county. It is about 55 percent Nauvoo soils, 15 percent Townley soils, 10 percent Montevallo soils, and 20 percent minor soils.

Nauvoo soils are gently sloping to strongly sloping, deep, well drained, and moderately permeable. They generally have a fine sandy loam surface layer and a clay loam subsoil.

Townley soils are strongly sloping, moderately deep, well drained, and slowly permeable. They generally have a silt loam surface layer and a silty clay subsoil.

Montevallo soils are steep, shallow, well drained, and moderately permeable. They generally have a silt loam surface layer and a silt loam subsoil.

Minor soils of this map unit are Docena and Sullivan soils. There are also areas of Urban land.

The soils of this map unit are used mainly for pasture and hay crops. Many areas are covered by urban structures.

2. Fullerton-Bodine-Urban land

Well and somewhat excessively drained soils that are moderately and moderately rapidly permeable and Urban land; soils formed in residuum from cherty limestone

These soils are on ridges associated with broad, northeast and southwest trending limestone valleys. They are mainly in the valley in which the city of Birmingham is located. These ridges are slightly to moderately dissected by drainageways and small streams, and relief is variable. Numerous small and some large sinkholes are in most areas of these soils.

The map unit makes up about 7 percent of the county. It is about 35 percent Fullerton soils, 20 percent Bodine soils, 20 percent Urban land, and 25 percent minor soils.

Fullerton soils are strongly sloping, deep, well drained, and moderately permeable. They generally have a cherty silt loam surface layer and a cherty silty clay loam subsoil.

Bodine soils are steep, deep, somewhat excessively drained, and moderately rapidly permeable. They generally have a cherty silt loam surface layer and a very cherty loam or very cherty clay loam subsoil.

Urban land consists of areas that are covered by houses, buildings, and roads.

Minor soils of the map unit are Allen, Decatur, Etowah, Ketona, and Sullivan soils.

The soils of this map unit are used mainly for urban structures. Other areas are used mostly for pasture and hay crops and woodland.

3. Nauvoo-Allen-Gorgas

Well drained soils that are moderately and moderately rapidly permeable; formed in residuum from sandstone and alluvium and colluvium

These soils are on a broad, northeast and southwest trending plateau in the northwestern part of the county. This plateau is slightly dissected by drainageways and small streams, and its elevation gradually decreases to the southeast. The plateau is sufficiently elevated to provide good air drainage, which contributes to an extended frost-free growing season.

This map unit makes up about 2 percent of the county. It is about 65 percent Nauvoo soils, 10 percent Allen soils, 10 percent Gorgas soils, and 15 percent minor soils.

Nauvoo soils are gently sloping to strongly sloping, deep, well drained, and moderately permeable. They generally have a fine sandy loam surface layer and a clay loam subsoil.

Allen soils are gently sloping, deep, well drained, and moderately permeable. They generally have a fine sandy loam surface layer and a clay loam subsoil.

Gorgas soils are steep, shallow, well drained, and moderately rapidly permeable. They generally have a sandy loam surface layer and a sandy loam subsoil.

Minor soils of the map unit are Docena, Montevallo, and Sullivan soils. There are also areas of Rock outcrop.

The soils of this map unit are used mainly for vegetable crops. Some areas are used for pasture and hay crops.

4. Gorgas-Nauvoo-Urban land

Well drained soils that are moderately rapidly and moderately permeable and Urban land; soils formed in residuum from sandstone

These soils are on Shades Mountain and other northeast and southwest trending mountains in the southeastern part of the county. The mountains are slightly dissected by drainageways and small streams, and elevation gradually decreases to the southeast.

This map unit makes up about 2 percent of the county. It is about 25 percent Gorgas soils, 20 percent Nauvoo soils, 15 percent Urban land, and 40 percent minor soils.

Gorgas soils are strongly sloping to steep, shallow, well drained, and moderately rapidly permeable. They generally have a sandy loam surface layer and a sandy loam subsoil.

Nauvoo soils are gently sloping to strongly sloping, deep, well drained, and moderately permeable. They generally have a fine sandy loam surface layer and a clay loam subsoil.

Urban land consists of areas that are covered by houses, buildings, and roads.

Minor soils of the map unit are Allen, Hanceville, Holston, Leesburg, Montevallo, Sullivan, and Townley soils. There are also areas of Rock outcrop.

The soils of this map unit are mainly associated with urban uses. Generally, other areas are used for woodland.

Undulating to rolling soils in valleys

The three general soil map units in this group make up about 10 percent of the county. This group consists of soils that have fair suitability for urban uses and good to fair suitability for farming and woodland uses.

5. Holston-Townley-Urban land

Well drained soils that are moderately and slowly permeable and Urban land; soils formed in alluvium and colluvium and in residuum from shale and siltstone

These soils are on the lower slopes of valleys and are most extensive in Shades Valley, which trends northeast and southwest across the southeastern part of the county. The valleys are slightly dissected by drainageways and small streams and are fairly uniform in relief.

This map unit makes up about 3 percent of the county. It is about 20 percent Holston soils, 15 percent Townley soils, 15 percent Urban land, and 50 percent minor soils.

Holston soils are gently sloping, deep, well drained, and moderately permeable. They generally have a loam surface layer and a clay loam subsoil.

Townley soils are strongly sloping, moderately deep, well drained, and slowly permeable. They generally have a silt loam surface layer and a silty clay subsoil.

Urban land consists of areas that are covered by buildings and roads.

Minor soils of the map unit are Albertville, Allen, Decatur, Docena, Etowah, Montevallo, Nauvoo, State, and Sullivan soils. There are also areas of Pits.

The soils of this map unit are mainly associated with urban uses. Other areas are used for pasture and hay crops and woodland.

6. Etowah-Decatur-Sullivan

Well drained soils that are moderately permeable; formed in cherty alluvium and colluvium, cherty limestone residuum, and noncherty alluvium

These soils are mostly on the lower slopes of limestone valleys, which are slightly dissected by drainageways and small streams and are fairly uniform in relief. Also, some narrow flood plains, which are frequently flooded, are in the lowest parts of the valleys.

This map unit makes up about 1 percent of the county. It is about 50 percent Etowah soils, 15 percent Decatur soils, 15 percent Sullivan soils, and 20 percent minor soils.

Etowah soils are gently sloping, deep, well drained, and moderately permeable. They generally have a loam surface layer and a silty clay loam subsoil.

Decatur soils are gently sloping, deep, well drained, and moderately permeable. They generally have a silt loam surface layer and a clay subsoil.

Sullivan soils are nearly level, deep, well drained, and moderately permeable. They have a seasonal high water table and are subject to flooding. Sullivan soils generally have a silt loam surface layer and a silt loam or loam subsoil.

Minor soils of the map unit are Docena, Fullerton, Ketona, and Tupelo soils. There are also areas of Rock outcrop, Urban land, and water.

The soils of this map unit are used mostly for pasture and hay crops and woodland.

7. Urban land-Tupelo-Decatur

Urban land and moderately well and well drained soils that are slowly and moderately permeable; soils formed in cherty limestone colluvium or residuum

These soils are on the lower slopes of limestone valleys and are mainly in the broad, northeast and southwest trending valley in which the city of Birmingham is located. The valleys are uniform in relief and are slightly dissected by streams.

This map unit makes up about 6 percent of the county. It is about 55 percent Urban land, 20 percent Tupelo soils, 10 percent Decatur soils, and 15 percent minor soils.

Urban land consists of areas that are covered by houses, buildings, and roads.

Tupelo soils are nearly level to gently sloping, deep, moderately well drained, and slowly permeable. They have a seasonal high water table. They generally have a silt loam surface layer and a silty clay subsoil.

Decatur soils are gently sloping, deep, well drained, and moderately permeable. They generally have a silt loam surface layer and a clay subsoil.

Minor soils of the map unit are Etowah, Holston, Ketona, and Sullivan soils. There are also areas of Pits.

The soils of this map unit are used mainly for urban structures. Other areas are idle or used for pasture and hay crops.

Steep soils on mountains, dissected plateaus, and valley sides

The four general soil map units in this group make up about 63 percent of the county. This group consists of soils that have fair suitability for woodland and recreation uses. Suitability for farming and urban uses is generally poor.

8. Bodine-Fullerton

Somewhat excessively drained and well drained soils that are moderately rapidly and moderately permeable; formed in residuum from cherty limestone

These soils are on valley uplands and are mainly in the broad, northeast and southwest trending valley in which the city of Birmingham is located. The valley sides are highly dissected by streams, and relief is variable. Numerous small and some large sinkholes are in most areas of these soils.

The map unit makes up about 4 percent of the county. It is about 40 percent Bodine soils, 35 percent Fullerton soils, and 25 percent minor soils.

Bodine soils are steep, deep, somewhat excessively drained, and moderately rapidly permeable. They generally have a cherty silt loam surface layer and a very cherty loam or clay loam subsoil.

Fullerton soils are strongly sloping, deep, well drained, and moderately permeable. They generally have a cherty silt loam surface layer and a cherty silty clay loam subsoil.

Minor soils of the map unit are Allen, Barfield, Etowah, Ketona, and Sullivan soils. There are also areas of Pits, Rock outcrop, and Urban land.

The soils of this map unit are used mostly for woodland. Some areas are used for urban structures.

9. Montevallo-Nauvoo

Well drained soils that are moderately permeable; formed in residuum from shale, siltstone, and sandstone

These soils are on dissected plateaus throughout the county, but they are mainly in the northwestern half of the county. These plateaus are highly dissected by streams, and relief is variable.

This map unit makes up about 51 percent of the county. It is about 30 percent Montevallo soils, 25 percent Nauvoo soils, and 45 percent minor soils.

Montevallo soils are steep, shallow, well drained, and moderately permeable. They generally have a silt loam surface layer and a silt loam subsoil.

Nauvoo soils are strongly sloping, moderately deep, well drained, and moderately permeable. They generally have a fine sandy loam surface layer and a clay loam subsoil.

Minor soils of the map unit are Allen, Docena, Gorgas, Holston, Palmerdale, State, Sullivan, and Townley soils. There are also areas of Dumps and Urban land.

The soils of this map unit are used mostly for woodland, coal mining, and recreation. Small areas are used for farming or for urban structures.

10. Bodine-Birmingham

Somewhat excessively drained and well drained soils that are moderately rapidly and moderately permeable; formed in residuum from cherty limestone, ironstone, and red sandstone

These soils are on northeast and southwest trending mountains in the southeastern part of the county. They are mainly on Red Mountain. These mountains are moderately dissected by drainageways and small streams and are variable in relief.

This map unit makes up about 4 percent of the county. It is about 35 percent Bodine soils, and 30 percent Birmingham soils, and 35 percent minor soils.

Bodine soils are steep, deep, somewhat excessively drained, and moderately rapidly permeable. They generally have a cherty silt loam surface layer and a very cherty loam or clay loam subsoil.

Birmingham soils are steep, moderately deep, well drained, and moderately permeable. They generally have a cobbly loam surface layer and a cobbly clay loam subsoil.

Minor soils of the map unit are Allen, Barfield, Decatur, Etowah, Fullerton, Gorgas, Leesburg, Nauvoo, Sullivan, and Tupelo soils. There are also areas of Rock outcrop and Urban land.

The soils of this map unit are used mostly for woodland and recreation. Some areas are used for urban structures.

11. Leesburg-Gorgas

Well drained soils that are moderately and moderately rapidly permeable; formed in residuum from sandstone and in colluvium

These soils are on northeast and southwest trending mountains in the southeastern part of the county. They are most extensive on the northwestern side of Shades Mountain. These mountains are moderately dissected by drainageways and are variable in relief.

This map unit makes up about 4 percent of the county. It is about 35 percent Leesburg soils, 15 percent Gorgas soils, and 50 percent minor soils.

Leesburg soils are steep, deep, well drained, and moderately permeable. They generally have a cobbly fine sandy loam surface layer and a cobbly sandy clay loam subsoil.

Gorgas soils are steep, shallow, well drained, and moderately rapidly permeable. They generally have a sandy loam surface layer and a sandy loam subsoil.

Minor soils of the map unit are Allen, Hanceville, Holston, Montevallo, Nauvoo, Sullivan, and Townley soils. There are also areas of Rock outcrop and Urban land.

The soils in this map unit are used mostly for woodland. Some areas are used for urban structures.

Nearly level soils on flood plains

This group makes up about 2 percent of the county. It consists of soils that have good suitability for farming and woodland. Suitability for urban uses is poor.

12. Sullivan-State

Well drained soils that are moderately permeable; formed in recent alluvium

These soils are on flood plains throughout the county. They are mainly in the southwestern part of Shades Valley. These soils generally have a seasonal high water table and are subject to flooding.

This map unit makes up about 2 percent of the county. It is about 40 percent Sullivan soils, 15 percent State soils, and 45 percent minor soils.

Sullivan soils are nearly level, deep, well drained, and moderately permeable. They generally have a silt loam surface layer and a silt loam or loam subsoil.

State soils are nearly level, deep, well drained, and moderately permeable. They generally have a silt loam surface layer and a clay loam subsoil.

Minor soils of the map unit are Bodine, Decatur, Docena, Etowah, Holston, Ketona, Montevallo, Nauvoo, Palmerdale, and Townley soils. There are also areas of Pits and Urban land.

The soils of this map unit are used mostly for crops and woodland.

detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, stoniness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Nauvoo fine sandy loam, 2 to 8 percent slopes, is one of several phases in the Nauvoo series.

Some map units are made up of two or more major soils. These map units are called soil complexes or soil associations.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Fullerton-Bodine complex, 8 to 15 percent slopes, is an example.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Montevallo-Nauvoo association, steep, is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits is an example. Miscellaneous areas are shown on the soil maps. Some miscellaneous areas are too small to be shown on the soil maps. However, these small areas are described in the map unit descriptions.

Table 5 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Descriptions of the detailed soil map units follow.

2—Albertville silt loam, 2 to 6 percent slopes. This gently sloping, well drained soil is on uplands of limestone valleys. Slopes are convex. The surface is slightly dissected by small upland drainageways. Areas range from 20 to 100 acres or more and are irregular in shape.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The subsoil is about 52 inches thick. The upper 3 inches is yellowish brown silty clay loam; the next 22 inches is yellowish brown silty clay; and the lower 27 inches is silty clay, mottled in shades of red, brown, and gray. The underlying material is soft weathered shale. In places, soils are similar to this Albertville soil except that they have either gray mottles, a clay loam texture in the upper part of the subsoil, or slopes of 6 to 10 percent.

The available water capacity of this soil is high. However, in most years, there are periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderately slow, and the shrink swell potential is moderate. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. A crust forms on the surface layer after hard rains. Unless limed, the surface layer is strongly acid or very strongly acid. This soil can be tilled within a medium range in moisture content.

Included with this soil in mapping are areas of Docena soils near drainageways and in depressional areas and small areas of Holston and Townley soils on uplands. The included soils make up about 30 percent of this map unit. Docena and Holston soils are contrasting soils, and use and management are different from that of Albertville soils. These contrasting soils make up about 15 percent of this map unit.

This soil is used mainly for pasture and hay crops. Some areas are used for cultivated crops and woodland.

This soil is suited to cultivated crops. Slope, the hazard of erosion, and moderately slow permeability are the main limitations. Plant cover is needed at least half of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbed preparation is affected by eroded areas where part of the subsoil has been mixed into the plow layer. Crops respond well to irrigation.

This soil is well suited to pasture and hay. Soil compaction and plant damage can be reduced by avoiding forage cutting operations and deferring grazing during wet seasons.

Coniferous trees are well suited to this soil, and the potential productivity is moderately high. Although there are no significant management concerns, harvesting during dry seasons will reduce the amount of soil compaction by heavy equipment.

Residential and industrial uses of this soil are affected by its moderately slow permeability and the moderate shrink-swell potential. The moderately slow permeability of the subsoil is a severe limitation to use of the soil as septic tank absorption fields. This limitation can be partly overcome by increasing the size of the absorption area.

The moderate shrink-swell potential is a moderate limitation for dwellings and small commercial buildings. Low strength is a severe limitation to local roads and streets. In some places, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Because this soil is gently sloping, minimal cutting and filling are needed at sites for small commercial buildings. In areas to be cut or filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

This soil is suited to most recreation uses. In some places, grading is needed to prepare sites for intense recreation uses. The moderately slow permeability of the subsoil is a moderate limitation.

Many sites for pond construction are available. The sites are closely associated with areas of included Docena soils. This Albertville soil is also suitable for lagoons because the shale substratum restricts the downward movement of water.

The soft shale and shale clay underlying some areas of this soil are useful as a clay source for brick.

This Albertville soil is in capability subclass IIe and in woodland ordination group 3o.

3—Allen fine sandy loam, 2 to 6 percent slopes. This gently sloping, well drained soil is on a broad sandstone plateau in the northwestern part of the county. Slopes are convex. The surface is slightly dissected by small upland drainageways. Areas range from 20 to 200 acres or more and are long and narrow in shape.

Typically, the surface layer is brown fine sandy loam about 7 inches thick. The subsoil is red sandy clay loam about 73 inches thick. In places, soils are similar to this Allen soil except that they have a yellower subsoil, or they have slopes of 6 to 10 percent.

The available water capacity of this soil is moderate to high. However, in most years, there are periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are small areas of Gorgas, Nauvoo, and Sullivan soils. Nauvoo is the most extensive included soil. The included soils make up about 30 percent of the map unit. Gorgas and Sullivan soils are contrasting soils, and use and management are different from that of Allen soils. These contrasting soils make up about 5 percent of the map unit.

This soil is used mainly for field crops and commercial vegetable crops. Some areas are used for pasture and hay crops. A few areas are in low density residential use.

This soil is well suited to vegetables. For commercial vegetable production (fig. 1), crops grown on large acreages include butterbeans, collards, field peas, and turnips. Smaller acreages of cabbage, cantaloup, sweet corn, okra, pimento pepper, spinach, stringbeans, sweet potatoes, tomatoes, and watermelons are also grown. Most growers produce 2 to 3 crops a year. This soil and adjacent Nauvoo soils are on a plateau that has good air drainage. This causes the growing season to be several weeks longer than typical for most areas in the county. This soil also has good potential for apples, grapes, peaches, and pears.

This soil is well suited to cultivated field crops. Slope and the hazard of erosion are the main limitations. Plant cover is needed at least half of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage. Crops respond well to irrigation. Local sources of water are used to irrigate crops. Yields of some crops such as cabbage, sweet corn, and melons are dependent on irrigation.

Figure 1.—Allen fine sandy loam, 2 to 6 percent slopes, is used mainly for vegetable crops.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil; the potential productivity is moderately high. There are no significant management concerns.

This soil has many favorable properties for residential use. Low strength is a moderate limitation for local streets. In some places, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Septic tank absorption fields function well on this soil. Because this soil is gently sloping, minimal cutting and filling for site preparation are needed for small commercial buildings.

This soil is well suited to most recreation uses. In some places, grading is needed for preparation of sites for intense recreation uses. The surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Ponds constructed on this soil have a risk of seepage because of the moderately permeable subsoil. To minimize the risk of seepage, construction materials should not be removed from the reservoir floor.

This Allen soil is in capability subclass IIe and in woodland ordination group 3o.

4—Allen fine sandy loam, 8 to 15 percent slopes. This strongly sloping, well drained soil is on mountain foot slopes, sides of limestone valleys, and stream terraces. Slopes are concave and convex. The surface is dissected by drainage from surrounding uplands. Areas are 40 to 100 acres or more and are long and narrow in shape.

Typically, the surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil is about 76 inches thick. The upper 5 inches is yellowish red loam, the next 17 inches is yellowish red sandy clay loam, the next 25 inches is yellowish red clay loam that has mottles in shades of brown and red, and the lower 29 inches is clay loam mottled in shades of brown and red. In places, soils are similar to this Allen soil except that they have slopes of less than 8 percent or more than 15 percent.

The available water capacity of this soil is moderate to high. However, in most years, there are periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately rapid. If this soil is cultivated, sheet, rill, and channel erosion are severe hazards. Unless limed, the surface layer is strongly to

very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Albertville, Bodine, Decatur, Docena, Fullerton, Holston, Montevallo, and Sullivan soils. The included soils make up about 50 percent of the map unit. Decatur, Fullerton, and Holston soils are the most extensive included soils. Bodine and Montevallo soils are on steep uplands. Albertville soils are on gently sloping uplands. Docena soils are in depressional areas, and Sullivan soils are on flood plains and in drainageways. Albertville, Bodine, Docena, Montevallo, and Sullivan soils are contrasting soils, and use and management are different from that of Allen soils. These contrasting soils make up about 10 percent of the map unit.

This soil is used mainly for woodland. Some areas are used for pasture, and a few areas are in residential use.

This soil is suited to cultivated crops. Slope and the hazard of erosion are the main limitations. Plant cover is needed at least three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways are needed to control erosion. Seedbeds can be prepared by minimum tillage. Crops respond well to irrigation.

This soil is well suited to pasture and hay crops. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil, and their potential productivity is moderately high. There are no significant management concerns.

This soil has many favorable properties for residential use. Low strength is a moderate limitation for local roads and streets. Some grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread as topsoil to help reestablished plants. Septic tank absorption fields function well on this soil. Slope is a severe limitation for small commercial buildings; grading, cutting and filling, and excavating are needed.

This soil is suited to most recreation uses. In many places, grading is needed for site preparation for intense recreation uses. The surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Many potential sites for pond construction exist on this soil. Seepage is a moderate limitation because of the moderately permeable subsoil. To minimize the risk of seepage, construction materials should not be removed from the reservoir floor.

This Allen soil is in capability subclass IVe and woodland ordination group 3o.

5—Allen-Urban land complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained Allen soils and areas of Urban land on mountain foot slopes and uplands of limestone valleys. Areas are 40 acres or more and long and narrow in shape. The areas of Allen soils and areas of Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Allen soils and similar soils make up about 35 percent of the map unit. Typically, the surface layer is dark brown fine sandy loam about 4 inches thick. The subsoil is about 76 inches thick. The upper 5 inches is yellowish red loam, the next 17 inches is yellowish red sandy clay loam, the next 25 inches is yellowish red clay loam that has mottles in shades of brown and red, and the lower 29 inches is clay loam mottled in shades of brown and red. Many areas have been altered by grading or by spreading excavated subsoil over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Allen soils is moderate to high. However, in most years during the growing season, soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately fast. Sheet, rill, and channel erosion is a severe hazard if the soil does not have a plant cover. Unless limed, the surface layer is strongly acid to very strongly acid.

Included in mapping are small areas of Albertville, Bodine, Docena, Fullerton, Holston, Montevallo, and Sullivan soils. The included soils make up about 35 percent of the map unit. Albertville, Bodine, Docena, Montevallo, and Sullivan soils are contrasting soils, and use and management are different from Allen soils. These contrasting soils make up about 10 percent of the map unit.

This unit is used primarily for residential and commercial structures. Other areas are mostly wooded or idle.

Allen soils have many favorable properties for residential use. Low strength is a moderate limitation for local roads and streets. Grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. For areas where the surface layer was stockpiled and respread over the excavated soil, plant growth is easy to maintain, and the need for irrigation is minimal. Plant growth is difficult where excavated subsoil has been spread over the surface; frequent watering of plants is necessary. Septic tank absorption fields function well on this soil.

Allen soils are suited to most recreation uses. In most places, grading is needed for sites for intense recreation uses. The surface layer should be removed before grading and respread to provide a good rooting medium for plant growth.

This map unit has not been assigned to a capability subclass or to a woodland ordination group.

6—Barfield-Rock outcrop complex, steep. This complex consists of steep, well drained, stony Barfield soils and areas of Rock outcrop on the sides of mountains and ridges that are underlain by limestone. Hard limestone bedrock is exposed as a series of parallel, contour ledges throughout this map unit. The Barfield soils and areas of Rock outcrop are so intricately mixed, or so small in size, that mapping them separately was not practical. Individual areas are 100 acres or more. Slope ranges from 10 to 50 percent.

Barfield soils and similar soils make up about 40 percent of the map unit. Typically, the surface layer is very dark grayish brown stony silty clay loam about 4 inches thick. The subsoil is dark brown stony silty clay about 7 inches thick. Underlying this is limestone bedrock. In places, soils are similar to Barfield soils except that they are loamy and underlain by sandstone bedrock.

Rock outcrop makes up about 35 percent of the map unit. Rock outcrop consists of hard limestone bedrock ledges. There are also loose cobbles, stones, and boulders on the surface between ledges.

The available water capacity for Barfield soils is very low. In most years, during the growing season, soil moisture is not adequate for optimum plant growth. Barfield soils have moderately slow permeability and a high shrink-swell potential. Surface runoff is rapid. Sheet and rill erosion is a very severe hazard if these soils do not have a plant cover. The surface layer is slightly acid to mildly alkaline.

Included in mapping are areas of Birmingham, Bodine, Fullerton, Nauvoo, and Tupelo soils. The included soils make up about 25 percent of the map unit.

The soils of this map unit are used primarily for woodland and recreation sites.

The soils of this map unit are not suited to cultivated crops, pasture, and hay because of the steep slopes and the numerous bedrock outcrops.

The soils of this map unit are suited to woodland use, but management is severely limited by numerous areas of bedrock outcrop. Barfield soils are suited to coniferous trees, primarily eastern redcedar. Potential productivity is moderately low. Vegetation is dominated by deciduous trees. Management concerns include a moderate windthrow hazard, a severe seedling mortality rate, a severe limitation for use of equipment, and a severe erosion hazard. Mechanical site-preparation, planting, and harvesting are extremely difficult. Fire control on soils in this complex is difficult because the complex is elevated and slopes are long and steep with little protection from winds.

The soils of this map unit are not favorable for residential and industrial uses because of steep slopes and the shallow soil depth of Barfield soils as well as the numerous outcrops of hard limestone bedrock. Numerous cracks and caverns in the limestone are open at the surface and connect to ground water. Excavating and leveling the surface generally cannot be accomplished without extensive blasting.

The soils of this map unit are suited to most low traffic recreation uses. Areas of limestone bedrock outcrop and ledges and the native vegetation contribute to the natural aesthetic appeal of this map unit.

Pond construction is not suited to soils of this map unit because of the cavernous nature of the underlying limestone and the absence of suitable construction material.

In many areas of this complex, the limestone underlying the soils is suitable for use as building stone, crushed aggregate, or ground limestone.

The soils in this map unit are in capability subclass VIIs and woodland ordination group 4x.

7—Bodine-Fullerton-Urban land complex, steep. This complex consists of steep, cherty, somewhat excessively drained Bodine soils and well drained Fullerton soils and areas of Urban land on uplands of limestone valleys. Many areas have sinkholes. The Bodine and Fullerton soils and areas of Urban land are so intricately mixed, or so small in size, that mapping them separately was not practical. Areas are 40 acres or more and are irregular in shape. Slope ranges from 15 to 45 percent in most areas.

Bodine soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of Bodine soils is brown cherty silt loam about 4 inches thick. The subsoil is more than 68 inches thick. The upper 8 inches is yellowish brown very cherty loam, the next 24 inches is strong brown very cherty loam, and the lower 36 inches is yellowish red very cherty clay loam.

Bodine soils are commonly on the sides of ridges and have slopes of 15 to 45 percent. Many areas have been altered either by grading or by spreading excavated subsoil on the surface.

Fullerton soils and similar soils make up about 20 percent of the unit. Typically, the surface layer of Fullerton soils is brown cherty silt loam about 5 inches thick. The subsurface layer is yellowish brown cherty silt loam about 5 inches thick. The subsoil is cherty clay loam more than 60 inches thick. The upper 26 inches is yellowish red, and the lower 24 inches is red.

Fullerton soils are generally on ridgetops and have slopes of 15 to 25 percent. Many areas have been altered either by grading or by spreading excavated subsoil on the surface.

The Urban land part of this complex makes up about 20 percent of the map unit. The areas, mostly on ridges, are covered by houses, streets, driveways, and parking areas.

The available water capacity is low for Bodine soils and moderate for Fullerton soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. Bodine soils are usually drier longer. Permeability is moderately rapid for Bodine soils

and moderate for Fullerton soils. Bodine soils have a low shrink-swell potential, and Fullerton soils have a moderate shrink-swell potential. Surface runoff is rapid. If these soils do not have a plant cover, sheet and rill erosion is a very severe hazard for Bodine soils and a severe hazard for Fullerton soils. Both soils are strongly to very strongly acid.

Included in mapping are areas of Allen and Etowah soils and small areas of soils that are on uplands and that have firm, plastic, slowly permeable subsoils. Also included are Ketona and cherty soils that are on stream beds and in sinkholes. The included soils make up less than 10 percent of the map unit.

The soils of this map unit are mostly in residential use. Other areas are mostly wooded.

The soils of this map unit are generally not suited to residential use because of steep slopes and fragments of chert. In most places, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Plant growth is difficult to maintain. Lawn care can be hazardous because of the steep slopes and the fragments of chert on the surface. Outdoor use of the areas around homes is extremely limited. Most soils on uplands in this complex have permeability rates that are suited to septic tank absorption fields, but slope is a severe limitation. Most dwellings have been built on areas of Fullerton soils and some areas of Bodine soils that have less than 25 percent slope. Other areas of this map unit are best used for adding acreage to existing homesites, greenbelts or undeveloped corridors, low traffic aesthetic and recreation use, and watershed management. Partly developed areas of this complex have a high hazard for damage by forest fires. Many areas of this complex have sinkholes. The presence of sinkholes indicates that some areas of these soils are underlain by cavernous limestone and a hazard of additional caving may exist. Onsite investigation for this hazard is recommended for new residential, industrial, or commercial uses.

Some areas of this complex are suited to most low traffic recreation uses. Removal of large fragments of chert is desirable in some areas to reduce possible bodily injury.

This map unit was not assigned to a capability subclass or to a woodland ordination group.

8—Bodine-Birmingham association, steep. This map unit consists of soils on Red Mountain and several other mountains with similar geology. The areas of these soils are long and narrow and are on mountains that are parallel to each other in a northeast and southwest direction across the county. The mountains generally have one side that is steeper than the other. The steeper side is called the scarp slope, and the other side is the back slope. The back slope roughly parallels the dip of the bedrocks, whereas the scarp slope cuts across strata of bedrock. The soils are in a regular pattern that is closely related to landscape position and underlying parent material. Areas of this map unit are 200 to 1,000 acres or more. Slope ranges from 10 to 45 percent in most areas.

Bodine soils and similar soils on the steep parts of back slopes make up about 40 percent of this unit. Typically, the surface layer of Bodine soils is very dark grayish brown cherty silt loam about 5 inches thick. The subsoil is yellowish red cherty clay loam about 55 inches thick. In places, soils are similar to Bodine soils except that they contain less chert or more clay or have a redder subsoil.

Birmingham soils and similar soils on ridges and upper parts of mountain sides make up about 35 percent of this unit. Typically, the surface layer of Birmingham soils is dark reddish brown cobbly silt loam about 5 inches thick. The subsoil is dusky red cobbly clay loam about 24 inches thick. Underlying this is slightly weathered ironstone and sandstone. In places, soils are similar to Birmingham soils except that they are commonly on small benches and ledges and on foot slopes of the scarp slope, are 40 to 60 inches thick, and contain fewer fragments.

The available water capacity of Bodine and Birmingham soils is low. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderately rapid for Bodine soils and moderate for Birmingham soils. Both soils have a low shrink-swell potential. Surface runoff is rapid. If these soils do not have a plant cover, sheet and rill erosion is a severe hazard. Both soils are slightly acid to very strongly acid.

Minor soils in mapping are Allen, Barfield, Etowah, Gorgas, Leesburg, Nauvoo, Sullivan, and Tupelo soils and areas of limestone (fig. 2) and sandstone bedrock outcrops on scarp slopes. Also included are areas that have been surface mined for iron ore.

Allen, Etowah, and Leesburg soils are primarily on toe slopes and foot slopes, and to a lesser extent, on coves and benches. Barfield and Tupelo soils are near limestone-bedrock outcrops on scarp slopes. Gorgas and Nauvoo soils are on back slopes. Sullivan soils are on flood plains. Limestone bedrock outcrops are primarily on the scarp slopes. Sandstone bedrock outcrops are near the upper portion of the scarp slopes. Piles of stone, cobbles, and boulders are usually located on areas down slope from rock outcrops. Small areas that were mined for iron ore are on all landscape positions but are common near Birmingham soils. The minor soils and Rock outcrop make up about 25 percent of the map unit.

Figure 2.—Limestone bedrock outcrop on the lower scarp slope of an area of Bodine-Birmingham association, steep.

Most of the acreage of this map unit is primarily in woodland. Some acreage on the south side of Birmingham is in low density residential use, and it has a few large commercial units. There are numerous isolated areas of communications facilities on these soils.

The soils of this association are generally not suited to cultivated crops and pasture and hay crops because of steep slopes, hazard of erosion, and fragments on the surface. Some small areas of minor soils, on foot slopes and ridgetops, are suited to pasture and hay crops, but these areas are generally small or isolated.

Soils of this association are suited to woodland. Suitable species, productivity potential, and management problems are variable.

The Bodine and Birmingham soils, on mountaintops and back slopes, are mostly suited to coniferous trees, but present stands are dominated by deciduous trees. Potential productivity is moderate. Steep slopes and rock fragments are limitations. Some areas of these soils are subject to the hazard of windthrow of trees during wet seasons. Some areas are subject to ice damage during freezing rain. Roads for logging, loading areas, and firelanes can be constructed on these soils, but road maintenance and erosion control are difficult. Poor harvesting techniques can cause severe erosion.

Fire control on all the soils of this association is difficult because of the high elevation, and slopes are too long and steep to offer protection from winds. The hazard of wildfire is increased by numerous urban developments along the base of mountains.

Most of the acreage of this map unit is not favorable to residential and industrial uses because of steep slopes. Plant cover is difficult to maintain. Extensive excavation is needed for dwelling sites on these soils, and the potential soil loss is enormous. Areas of minor soils that have slopes suited to dwelling sites are generally small and poorly accessible. Dwellings on or near mountaintops have greater susceptability to damage by wind or ice storms. Some areas of minor soils, located mostly on scarp slopes, are subject to land slides if they do not have a plant cover.

The soils of this map unit are suited to most low traffic recreation uses. Providing aesthetic appeal is a large variety of native plants and shrubs, especially on the scarp slopes, growing among sandstone and limestone bedrock cliffs and ledges and broken rockpiles. A few sites are suitable for constructing ponds.

These Bodine soils are in capability subclass VIIs and in woodland ordination group 4f. These Birmingham soils are in capability subclass VIIe and in woodland ordination group 4r.

9—Bodine-Fullerton association, steep. This map unit consists of Bodine and Fullerton soils on steep, cherty uplands in limestone valleys and on several prominent ridges. Slopes generally range from 15 to 45 percent. Many areas of this unit have small to large sinkholes. The soils are in a regular pattern that is closely related to landscape position. Areas of this map unit are 200 to 1,000 acres or more.

Bodine soils and similar soils, on the sides of ridges, make up 55 percent of the map unit. Typically, the surface layer of Bodine soils is brown cherty silt loam about 4 inches thick. The subsoil is more than 68 inches thick. The upper 8 inches is yellowish brown very cherty loam, the next 24 inches is strong brown very cherty loam, and the lower 36 inches is yellowish red very cherty clay loam. In places, soils are similar to Bodine soils except that they either have less chert or have a redder subsoil.

Fullerton soils and similar soils, on ridgetops, make up about 30 percent of the map unit. Typically, the surface layer of Fullerton soils is brown cherty silt loam about 5 inches thick. The subsurface layer is yellowish brown cherty silt loam about 5 inches thick. The subsoil is cherty clay loam more than 50 inches thick. The upper 26 inches is yellowish red, and the lower 24 inches is red. In some areas, soils are similar to Fullerton soils except that they either have a clay loam texture or have a yellower subsoil and are generally on foot slopes and colluvial fans.

The available water capacity is low for Bodine soils and moderate for Fullerton soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. This period is longer for Bodine soils. Permeability is moderately rapid for Bodine soils and moderate for Fullerton soils. Bodine soils have a low shrink-swell potential. Fullerton soils have a moderate shrink-swell potential. Surface runoff is rapid. If these soils do not have a plant cover, sheet and rill erosion is very severe for Bodine soils and severe for Fullerton soils. Both soils are strongly to very strongly acid.

Minor soils in this association are Allen and Etowah soils and small areas of soils, on uplands, that have firm, plastic, slowly permeable subsoils. Other soils in the map unit are Ketona soils and cherty soils on flood plains and in sinkholes. These minor soils generally make up about 15 percent of the map unit.

The soils of this association are used mostly for woodland. A few areas are used for pasture or small residential uses.

The soils of this association are generally not suited to cultivated crops, pasture, and hay crops because of steep slopes, the hazard of erosion, and fragments of chert in the soil and on the surface. Areas of these soils that have suitable slopes for crops are generally small and isolated.

The soils of this association are suited to woodland use. The soils on the valley sides are suited to coniferous and deciduous trees, and the potential productivity is moderate to moderately high. Limitations to management are the steep slopes of Bodine and Fullerton soils and the fragments of chert in Bodine soils. Roads for logging, loading areas, and fire lanes can be constructed on these soils, but maintenance of the roads and control of erosion are difficult. Poor harvesting techniques can cause severe erosion. If grading is necessary for loading areas, stockpiling of the surface layer and respreading it after harvest will help in site restoration. Wetness of the included flood plain soils is a limitation to harvesting the timber during winter and spring. These soils and associated streams are natural fire barriers in many areas.

The soils of this association are not favorable for residential uses because of steep slopes and fragments of chert. Extensive excavation is needed for house sites because of the steep soils. The hazard of soil loss is very severe. Most soils on the sides of the valleys have permeability rates that are suited to septic tank absorption fields, but slope is a severe limitation. Areas of Fullerton soils that have slopes favorable for residential sites are generally small and poorly accessible. Many areas of this association have sinkholes which indicate that some areas are underlain by cavernous limestone, and the hazard of caving may exist. Onsite investigations for this hazard are recommended for sites for any new residential, industrial, or commercial uses. In many areas of this association, the cherty material underlying the soil is used for construction material, especially for highways (fig. 3).

These soils are suited to most low traffic recreation uses. Removal of large fragments of chert may be desirable in some areas. A layer of chert-free topsoil is needed for intense recreation uses where grading and cutting and filling are needed.

Pond construction sites are numerous on these soils, but seepage is a moderate to severe limitation.

These Bodine soils are in capability subclass VIIs and in woodland ordination group 4f. These Fullerton soils are in capability subclass IVe and in woodland ordination group 3o.

10—Decatur silt loam, 2 to 8 percent slopes. This gently sloping to sloping, well drained soil is on uplands of limestone valleys. Slopes are convex. Some areas of this soil have small sinkholes. The surface is slightly dissected by small drainageways. Areas are 20 to 100 acres or more and irregular in shape.

Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil is dark red clay about 65 inches thick. Some areas have soils similar to

Figure 3.—Cherty material in an area of Bodine-Fullerton association, steep, is excavated for use in highway construction.

this Decatur soil except that the subsoil is either less clayey or is 45 to 65 inches thick. In some places, soils are similar except that they are severely eroded and have a silty clay loam surface layer or have slopes of more than 8 percent.

The available water capacity of this soil is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. These periods are longer where the surface layer is silty clay loam. Permeability and the shrink-swell potential are moderate. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is medium to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Etowah, Fullerton, and Tupelo soils on uplands and Docena, Ketona, and Sullivan soils in drainageways, depressions, and sinkholes. The included soils make up about 30 percent of the map unit. Docena, Ketona, Sullivan, and Tupelo soils are contrasting soils, and use and management are different from Decatur soils. These contrasting soils make up about 10 percent of the map unit.

This soil is used primarily for pasture and hay crops. Some areas are used for cultivated crops. A few areas are in residential or industrial use.

This soil is well suited to cultivated crops. Slope and the hazard of erosion are the main limitations. Plant cover is needed at least half of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage except on small eroded areas where the subsoil has been mixed into the plow layer. Crops respond well to irrigation.

This soil is well suited to pasture and hay crops. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil, and the potential productivity is moderately high. There are no significant management concerns.

The properties of this soil are favorable for residential and industrial uses. Low strength is a moderate limitation for local roads and streets. The moderate shrink-swell potential is a limitation for dwellings and small commercial buildings. For industrial and commercial facilities, minimal cutting and filling is needed. In areas to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide good rooting medium

for plants. Septic tank absorption fields function well on this soil. The presence of sinkholes indicates that some areas of this soil are underlain by cavernous limestone, and a hazard of caving may exist. Onsite investigations for this hazard are recommended for any new residential, commercial, and industrial uses.

This soil is well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses. The surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Potential sites for pond construction are few. Seepage is a severe limitation.

This Decatur soil is in capability subclass IIe and in woodland ordination group 3o.

11—Decatur silt loam, 8 to 15 percent slopes. This strongly sloping, well drained soil is on uplands of limestone valleys. Slopes are convex. Some areas of this soil have small sinkholes. The surface is slightly dissected by small drainageways. Areas are 20 to 200 acres or more and irregular in shape.

Typically, the surface layer is dusky red silt loam about 6 inches thick. The subsoil is dark red and about 66 inches thick. The upper part of the subsoil is silty clay loam, and the lower part is silty clay. In places, soils are similar to Decatur soils except that they have a subsoil of clay loam, or they are 40 to 60 inches thick. Some areas of similar soils are severely eroded, or slopes are more than 15 percent or less than 8 percent.

The available water capacity of this soil is high. However, in most years there are brief periods in which soil moisture is not adequate for optimum plant growth. These periods are longer where the surface layer is severely eroded. Permeability and shrink-swell potential are moderate. Surface runoff is moderately rapid. If this soil is cultivated, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is medium to very strongly acid. This soil can be tilled within a fairly wide range in moisture content.

Included with this soil in mapping are areas of Allen, Fullerton, Etowah, Docena, Ketona, and Sullivan soils. The included soils make up about 35 percent of the map unit. Docena, Ketona, and Sullivan soils are contrasting soils, and use and management are different from Decatur soils. These contrasting soils generally make up about 10 percent of the map unit.

This soil is used primarily for pasture, hay, and woodland. A few areas are in residential or industrial use.

This soil is suited to cultivated crops. Slope and the hazard of erosion are the primary limitations. Plant cover is needed at least three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage except on eroded areas where part of the subsoil has been mixed into the plow layer. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil; their potential productivity is moderately high. There are no significant management concerns.

This soil has favorable properties for residential uses. However, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a moderate limitation for local roads and streets. The moderate shrink-swell potential is a limitation for dwellings and small commercial buildings. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants. Septic tank absorption fields function well on this deep soil. The presence of sinkholes indicate that some areas of this soil are underlain by cavernous limestone, and a hazard of caving may exist. Onsite investigations for this hazard are recommended for sites for any new residential, industrial, or commercial uses.

For industrial and commercial facilities, grading, excavating, and cutting and filling are needed. However, this soil is more desirable for these uses than soils that have similar slopes because of the relative ease and depth to which the soil can be excavated.

This soil is suited to most recreation uses. In many areas, grading is needed for sites for intense recreation uses. The surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Potential sites for pond construction are few on this soil. Seepage is a severe limitation.

This Decatur soil is in capability subclass IVe and in woodland ordination group 3o.

12—Decatur-Urban land complex, 2 to 8 percent slopes. This complex consists of gently sloping, well drained Decatur soils and areas of Urban land on uplands of limestone valleys. Some areas have small sinkholes. Areas are 40 acres or more and are irregular in shape. The areas of Decatur soils and areas of Urban land are so intricately mixed, or so small in size, that mapping them separately was not practical.

Decatur soils and similar soils make up about 45 percent of the map unit. Typically, the surface layer is dark reddish brown silt loam about 7 inches thick. The subsoil is dark red clay about 65 inches thick. Many areas have been altered either by grading or by having excavated subsoil spread over the surface layer.

The Urban land makes up about 40 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Decatur soils is high. However, in most years, there are brief periods in which

soil moisture is not adequate for optimum plant growth. Permeability and the shrink-swell potential are moderate. Surface runoff is moderately slow. Unless limed, the surface layer is medium to very strongly acid. If these Decatur soils do not have a plant cover, sheet and rill erosion is a moderate hazard.

Included in mapping are areas of Etowah, Fullerton, and Tupelo soils on uplands. These soils are the most extensive of the included soils. Also included are small areas of Docena, Ketona, and Sullivan soils in narrow drainageways, small depressions, and sinkholes. The included soils make up about 15 percent of the map unit.

This complex is primarily in residential, commercial, and industrial use. Some small areas are idle.

Decatur soils have favorable properties for residential uses. In some areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a moderate limitation for local roads and streets. Plant growth is difficult to maintain on areas where the surface layer has been removed or where excavated subsoil has been spread over the surface layer. Plants on these areas generally need frequent watering. In areas where the surface layer was stockpiled and respread over the excavated subsoil, plant growth is easy to maintain, and the need to water plants is minimal. Septic tank absorption fields function well on this soil. Because the Decatur soils are gently sloping and only small amounts of cutting and filling are needed, the soil is favorable for small commercial buildings. The presence of sinkholes indicates that areas of this unit are underlain by limestone, and a hazard of caving may exist. Onsite investigations for this hazard are recommended for sites for any new residential, commercial, and industrial uses.

Decatur soils are well suited to most recreation uses. In some areas, grading is needed for sites for intense recreation uses. The surface layer should be removed before grading, stockpiled, and respread to provide a good rooting medium for plants.

This map unit was not assigned to a capability subclass or to a woodland ordination group.

13—Docena complex, 0 to 4 percent slopes. This complex consists of gently sloping, moderately well drained Docena soils and other soils in upland depressional areas, toe slopes, and the heads of drainageways. Slopes are concave. The surface is dissected by drainage from surrounding uplands. Areas are 10 to 100 acres or more and are irregular in shape. The areas of Docena soils and other soils are so intricately mixed, or so small, that mapping them separately was not practical.

The Docena soils and similar soils generally make up about 70 percent of the map unit. Typically, the surface layer of Docena soil is dark grayish brown silt loam about 4 inches thick. The subsoil is about 54 inches thick. It is brownish yellow mottled in shades of yellow, brown, and gray. The upper 36 inches is friable silt loam, and the lower 18 inches is firm silty clay loam. The underlying material is mottled, firm silty clay loam. In places, soils are similar to Docena soils except that they are more poorly drained or have slopes of up to 8 percent.

The available water capacity of Docena soils is high, and the soil moisture is generally adequate for optimum plant growth throughout the growing season. Docena soils are moderately permeable and have a low shrink-swell potential in the upper part of the subsoil. The lower part of the subsoil is moderately slowly to slowly permeable, and it has a moderate shrink-swell potential. A seasonal high water table is between 1 1/2 and 3 feet below the surface during the winter and early spring. If Docena soils are cultivated, sheet and rill erosion is a slight hazard. Unless limed, the surface layer is medium acid to very strongly acid. It can be tilled within a wide range in moisture content.

Included with Docena soils in mapping are small areas of Albertville, Holston, State, Sullivan, and Townley soils. Use and management of the included soils are different from that for Docena soils. The included soils make up about 30 percent of the map unit.

The soils of this map unit are used primarily for pasture and hay. Some areas are used for cultivated crops, woodland, or residential structures.

The soils are well suited to cultivated crops. However, the seasonal high water table and the slow or moderately slow permeability of the lower part of the subsoil are limitations. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Drainage is needed to remove or lower the high water table and to remove surface runoff from adjacent uplands. The wetness can delay seedbed preparation.

The soils of this map unit are well suited to pasture and hay. Soil compaction and plant damage can be reduced by timely forage cutting and by deferred grazing during wet seasons.

Coniferous and deciduous trees are well suited to Docena soils; the potential productivity is high. Wetness is a significant management concern, but harvesting during dry seasons will reduce the amount of soil damage by equipment.

Residential and industrial use of these soils is affected by the seasonal high water table, by the moderately slow to slow permeability, and by the moderate shrink-swell potential of the lower part of the subsoil. Wetness and permeability are severe limitations to use of these soils as septic tank absorption fields. Low strength is a severe limitation for local roads and streets. In some areas, grading, cutting and filling, and excavating are needed for local roads and streets and for sites of dwellings and small commercial buildings.

These soils are fairly well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses. Wetness is a moderate limitation. Subsurface and surface drainage help to lower the seasonal high water table.

Potential sites for pond construction are numerous on these soils (fig. 4). The soils are suited for lagoons because they are gently sloping and restrict the downward movement of water. Sealing techniques help to prevent lagoon effluent from seeping into the seasonal high water table.

Some areas are underlain by soft shale and shale clay that are useful as clay sources for brick.

The soils of this map unit are in capability subclass IIw and in woodland ordination group 2w.

14—Dumps. This miscellaneous area consists of small areas of coal mine tailings that are residue from deep mining of coal. The tailings are generally dumped in piles that range from 50 to 300 feet above the surrounding soils. Most areas are composed of shale and fragments of bedrock, and they contain little or no soil material. They have very steep side slopes and little or no vegetation grow on them. Most of the older piles have red rock that is produced by intense oxidation for several years. The red rock is used as a base in constructing roads and parking lots. Some areas have been partly mined to obtain construction material. Areas are 20 to 200 acres and irregular in shape.

Included are small areas of unaltered and slightly altered soils. These soils generally make up less than 15 percent of the map unit.

This map unit is not assigned to a capability subclass or to a woodland ordination group.

15—Etowah loam, 2 to 8 percent slopes. This gently sloping to sloping, well drained soil is on colluvial fans, foot slopes, and toe slopes of limestone valleys (fig. 5). Irregular ridges or knolls are convex and depressions are concave. Some areas have sinkholes. The surface is dissected by drainage from surrounding uplands. Areas are 20 to 100 acres or more and irregular in shape.

Typically, the surface layer is dark brown loam about 6

Figure 4.—Pond for livestock on Docena complex, 0 to 4 percent slopes; in background area is Townley-Nauvoo complex, 8 to 15 percent slopes.

Figure 5.—Etowah loam, 2 to 8 percent slopes, is well suited to cultivated crops, hay and pasture, and woodland uses.

inches thick. The subsoil is more than 59 inches thick. It is yellowish red silty clay loam that has strong brown and light yellowish brown mottles in the lower part. In places, soils are similar to this Etowah soil except that they have a surface layer that has more chert, or it is thinner because of sheet erosion or thicker because of sheet erosion deposits, or it is silt loam. Some similar soils have slopes of either less than 2 percent or more than 8 percent.

The available water capacity of this soil is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid. The soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Decatur, Fullerton, Sullivan, and Tupelo soils. Many areas in the Cahaba Valley contain a few areas of limestone bedrock outcrop. The included soils and Rock outcrop generally make up about 30 percent of the map unit. Sullivan and Tupelo soils are contrasting soils, and use and management are different from Etowah soils. These contrasting soils generally make up about 10 percent of the map unit.

This soil is used primarily for cultivated crops, pasture, and hay. Some areas are in residential or industrial use.

This soil is well suited to cultivated crops. Slope and the hazard of erosion are limitations. Plant cover is needed half of the time. Contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Terraces also help to control erosion, but the undulating shape of the surface in some areas makes construction difficult. Tillage is difficult in small areas that have a high content of small chert fragments in the surface layer. Seedbeds can be prepared by minimum tillage except in small severely eroded areas where part of the subsoil has been mixed into the plow layer. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns. Forage cutting operations are affected by fragments of chert on the surface in a few small areas.

Coniferous and deciduous trees are well suited to this soil; their potential productivity is moderately high. There are no significant management concerns.

This soil has favorable properties for residential and industrial uses. Low strength is a moderate limitation for local roads and streets. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants. Septic tank absorption fields function well on this soil. The ease of excavation of this soil and the depth to which it and the underlying material can be excavated make it desirable for sanitary landfills.

This soil is well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses.

Sites for pond construction are few on this soil, and seepage is a moderate limitation.

This Etowah soil is in capability subclass IIe and in woodland ordination group 2o.

16—Etowah-Rock outcrop complex, 2 to 8 percent slopes. This complex consists of gently sloping, well drained Etowah soils and areas of Rock outcrop on colluvial fans and stream terraces of the Cahaba Valley. Ridges and knolls have convex slopes. Depressions and drainageways have concave slopes. Some areas have small sinkholes. Many areas have small surface openings to underground limestone caverns. Areas are 20 to 200 acres or more and irregular in shape. The areas of Etowah soils and areas of Rock outcrop are so intricately mixed, or so small, that mapping them separately was not practical.

Etowah soils and similar soils make up about 65 percent of the map unit. Typically, the surface layer of Etowah soils is reddish brown loam about 6 inches thick. The subsoil is clay loam about 54 inches thick. The upper 23 inches is red, and the lower 31 inches is red and has strong brown mottles. In places, soils are similar to Etowah soils except that they either have subsoil 40 to 60 inches thick or limestone bedrock at a depth of 40 to 60 inches from the surface, or they have slopes of more than 8 percent.

Rock outcrop makes up about 15 percent of the map unit. Rock outcrop consists of hard limestone bedrock outcrops. The limestone outcrop is generally 1 to 6 feet in diameter, 1 to 3 feet high, and from 6 to several hundred feet apart. Soils are generally deep a few feet away from Rock outcrop.

The available water capacity of Etowah soils is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Etowah soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately slow. If these soils are cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid.

Included with these soils in mapping are small areas of Decatur, Fullerton, Sullivan, and Tupelo soils and soils similar to Etowah soils except that the lower part of the subsoil is slowly permeable clay. The included soils make up about 20 percent of the map unit. Sullivan and Tupelo soils are contrasting soils, and use and management are different from Etowah soils. These contrasting soils generally make up about 10 percent of the map unit.

The soils of this map unit are used primarily for pasture and hay crops. A few areas are in residential or industrial use. A few areas are wooded.

These soils are not suited to cultivated crops. Areas of Rock outcrop (fig. 6) are a severe limitation. In some areas, the Rock outcrop is spaced far enough apart to permit small areas to be cultivated. But the hazard of damage to equipment is severe. A few small areas have had some of the bedrock removed by blasting.

These soils are suited to pasture and hay, but Rock outcrop is a significant management concern. Pasture mowing for weed and brush control and forage cutting are difficult.

Coniferous and deciduous trees are well suited to Etowah soil. There are no significant management concerns, but harvesting and machine planting is affected by Rock outcrop.

The soils of this complex have some very favorable and some very unfavorable properties for residential and industrial uses. In some areas, grading is necessary for local roads and streets, small commercial buildings, and dwelling sites. Low strength is a moderate limitation for local roads and streets. In areas between Rock outcrop, Etowah soil can be excavated to depths of 6 feet or more with light excavating machinery. However, the areas of bedrock generally require blasting for removal. Septic tank absorption fields function well when installed entirely on the Etowah soils. Many caverns in the underlying limestone connect to ground water, and many of these caverns have small openings on the surface. Some areas of this complex have sinkholes. The sinkholes indicate that some areas of these soils are underlain by cavernous limestone, and the hazard of caving may exist. Onsite investigations for this hazard are recommended for sites for any new residential, industrial, or commercial uses.

The soils of this map unit are well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses. In most areas, Rock outcrop generally must be removed by blasting.

Pond construction is not recommended because of the risk of seepage through the highly permeable colluvium and the cavernous limestone.

The soils of this map unit are in capability subclass IVs and in woodland ordination group 2x.

17—Fullerton-Bodine complex, 8 to 15 percent slopes. This complex consists of strongly sloping, cherty, well drained Fullerton soils and somewhat excessively drained Bodine soils on uplands of limestone valleys. Slopes are convex. Many areas are moderately eroded because of past cultivation. Many areas have sinkholes. Individual areas are 40 acres or more and irregular in shape. The areas of Fullerton and Bodine soils in this complex are so intricately mixed, or so small, that mapping them separately was not practical.

Fullerton soils and similar soils make up about 65 percent of the map unit. Typically, the surface layer of Fullerton soils is dark brown cherty silt loam about 6

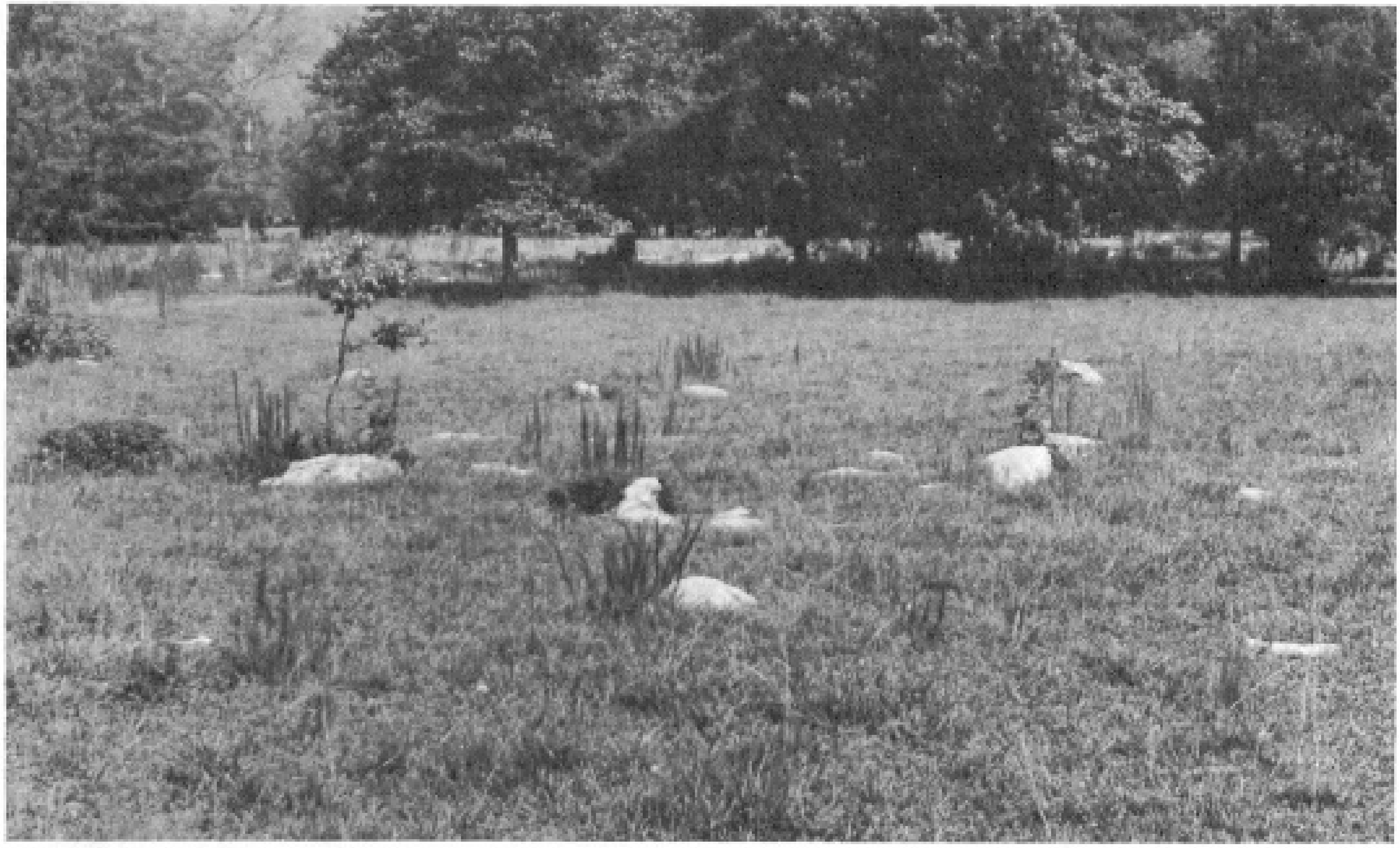


Figure 6.—Rock outcrop makes cultivated crops impractical and makes hay and pasture management difficult on this Etowah-Rock outcrop complex, 2 to 8 percent slopes.

inches thick. The subsoil is cherty silty clay loam more than 59 inches thick. The upper 29 inches is yellowish red, and the lower 30 inches is dark red and has strong brown mottles. In places, soils are similar to Fullerton soils except that they have yellower subsoil or have clay texture, or slopes are either less than 8 or more than 15 percent.

Bodine soils make up about 20 percent of the map unit. Typically, the surface layer of Bodine soils is dark yellowish brown very cherty silt loam about 5 inches thick. The subsoil is very cherty clay loam about 67 inches thick. The upper 27 inches is brownish yellow and strong brown, and the lower 40 inches is mottled in shades of yellow, brown, and red. In places, slope is more than 15 percent.

The available water capacity is moderate for Fullerton soils and low for Bodine soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. This period is longer for Bodine soils. Permeability is moderate for Fullerton soils and moderately rapid for Bodine soils. Bodine soils have a low shrink-swell potential, and Fullerton soils have a moderate shrink-swell potential. Surface runoff is moderately rapid. If cultivated, both soils have a severe hazard for sheet and rill erosion. Unless limed, the surface layer of both soils is strongly acid to very strongly acid. Fullerton soils can be tilled within a wide range in moisture content.

Included in mapping are areas of Etowah soils on small colluvial fans and toe slopes and areas of Ketona and Sullivan soils along narrow drainageways and on flood plains and in the basins of sinkholes. The included soils make up less than 15 percent of the map unit. Ketona and Sullivan soils are contrasting soils, and use and management are different from Fullerton and Bodine soils. These contrasting soils make up about 5 percent of the map unit.

These soils are used primarily for pasture and woodland. Some areas are in residential use.

These soils are poorly suited to cultivated crops. Slope, the hazard of erosion, and fragments of chert on the surface are the limitations. Most areas of Bodine soils are not suited to cultivated crops because of steep slopes and chert fragments. If these soils are cultivated,

plant cover is needed at least three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. In some areas, tillage is affected by the high content of chert fragments in the surface layer. Seedbeds can be prepared by minimum tillage except in small, severely eroded areas where part of the subsoil has been mixed into the plow layer. Crops respond well to irrigation.

These soils are suited to pasture and hay. There are no significant management concerns for most areas. Forage cutting is affected on areas that have chert fragments on the surface.

Coniferous and deciduous trees are suited to these soils, and the potential productivity is moderately high. There are no significant management concerns on the Fullerton soils, but on the Bodine soils erosion is a moderate hazard and equipment use is limited.

These soils have favorable properties for residential uses. In most areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. The amount of grading can be minimized if streets are laid out laterally along the ridgetops and extend to the side slopes. Low strength and small stones are moderate limitations for local roads and streets. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread over the area for a good rooting medium for plants. Chert-free topsoil is needed in many areas for normal lawn management. Septic tank absorption fields function well on these soils. Slope is a severe limitation for use of these soils as sites for small commercial buildings; grading, cutting and filling, and excavating are needed.

The included soils in sinkholes have severe limitations for dwellings because of the risk of caving and poor surface drainage outlets. Sinkholes in these soils indicate that many areas are underlain by cavernous limestone, and the hazard of additional caving may exist. Onsite investigation of this hazard is recommended for sites for any new residential, industrial, or commercial uses.

These soils are suited to most recreation uses. In many areas, grading is needed for site preparation for intense recreation uses. An application of chert-free topsoil may be necessary to minimize bodily injury. For some recreation uses, removal of the large chert fragments may be desirable.

Ponds can be constructed on these soils, but seepage is a moderate to severe limitation.

The underlying cherty material of these soils is used as construction material, especially for highways.

These Fullerton and Bodine soils are in capability subclass IVs. The Fullerton soils are in woodland ordination group 3o, and the Bodine soils are in woodland ordination group 4f.

18—Fullerton-Urban land complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained, cherty Fullerton soils and areas of Urban land on uplands of limestone valleys. Many areas have sinkholes. Areas are 40 acres or more and irregular in shape. The areas of Fullerton soils and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Fullerton soils and similar soils make up about 45 percent of the map unit. Typically, the surface layer is dark brown cherty silt loam about 6 inches thick. The subsoil is cherty silty clay loam more than 59 inches thick. The upper 29 inches is yellowish red, and the lower 30 inches is dark red that has strong brown mottles. Many areas have been altered either by grading or by having excavated subsoil spread over the surface layer.

The Urban land makes up about 30 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity for Fullerton soils is moderate. However, in most years, there are periods in which soil moisture is not adequate for optimum plant growth. Fullerton soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately fast. If Fullerton soils do not have a plant cover, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is strongly to very strongly acid.

Included in mapping are small areas of Etowah soils on colluvial fans and toe slopes; Bodine soils on steep areas near drainageways and along the rims and sides of sinkholes; and Sullivan or Ketona soils on drainageways, flood plains, and sinkhole basins. These inclusions make up about 25 percent of most areas.

This complex is used primarily for residential and commercial areas. Some small areas are mostly wooded or idle.

Fullerton soils have favorable properties for residential uses. In most areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength and small stones are moderate limitations for local roads and streets. Plant growth is difficult to maintain where excavated subsoil has been spread over the surface. Plants on these areas generally need frequent watering. For areas where the surface layer was stockpiled and respread over the excavated soil, or where topsoil has been used to cover the cherty subsoil, plant growth is easy to maintain, and the need for watering plants is minimal. Septic tank absorption fields function well on this soil. Cutting and filling are needed for small commercial building sites because the soil is strongly sloping.

Included soils in sinkholes are poorly suited to urban uses because of the risk of caving and the poor surface drainage outlets. Sinkholes indicate that many areas of these soils are underlain by cavernous limestone, and the hazard of caving may exist. Onsite investigation for

this hazard is recommended for sites for new residential, industrial, and commercial uses.

These soils are suited to most recreation uses. In most areas, grading is needed for sites for intense recreation uses. Applying chert-free topsoil may be necessary to prevent bodily injury. For some recreation uses, removal of the larger fragments of chert may be desirable.

This map unit was not assigned to a capability subclass or to a woodland ordination group.

19—Gorgas-Rock outcrop complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained Gorgas soils and areas of Rock outcrop on the back slopes of mountains and ridges that are underlain by sandstone. Areas are 40 acres or more and are long and broad in shape. The areas of Gorgas soils and areas of Rock outcrop are so intricately mixed, or so small, that mapping them separately was not practical.

Gorgas soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of Gorgas soils is very dark grayish brown over brown fine sandy loam about 6 inches thick. The subsoil is strong brown sandy loam about 10 inches thick. The underlying material is hard sandstone bedrock. In places, soils are similar to Gorgas soils except that they are less than 10 inches thick and are only partly covered by plants.

Rock outcrop makes up about 20 percent of the map unit. Rock outcrop consists of hard sandstone bedrock exposures at the surface that range from about 10 square feet to several acres, or it is at shallow depths beneath the surface. Rock outcrop generally does not project more than 10 feet above ground level; in most areas it projects less than 2 feet above ground level.

The available water capacity of Gorgas soils is very low. In most years, there are frequent periods in which soil moisture is not adequate for optimum plant growth. Gorgas soils are moderately rapidly permeable and have a low shrink-swell potential. Surface runoff is moderately rapid. Movement of water in the soil during wet seasons is mostly lateral, downslope along the soil-rock contact, or along rock cracks immediately beneath the surface. If the soil does not have a plant cover, sheet and rill erosion is a severe hazard. The surface layer is slightly to very strongly acid.

Included in mapping are many small areas of soils similar to Gorgas soils, on knolls and low ridges, except that they have either bedrock or soft weathered sandstone at a depth of 20 to 40 inches. Also included are small areas of Hanceville, Montevallo, Nauvoo, and Sullivan soils. The included soils make up about 30 percent of the map unit. Hanceville, Nauvoo, and Sullivan soils are contrasting soils, and use and management are different from Gorgas soils. These contrasting soils make up about 20 percent of the map unit.

The soils of this map unit are used primarily for woodland. A few areas are used for pasture or are in low density residential use.

The soils of this map unit are not suited to cultivated crops, pasture, or hay because of the numerous areas of Rock outcrop and the shallow depth to bedrock of Gorgas soil.

Gorgas soils are suited to coniferous trees, but potential productivity is only moderately low because of shallow depth to rock. Numerous areas of Rock outcrop seriously limit the use of machines in preparing sites, planting, and harvesting.

The soils of this map unit are not favorable for residential use. The shallow depth to bedrock severely limits grading for local roads and streets and preparing dwelling and building sites. Blasting is generally necessary to make excavations for sewers and waterlines, basements, and septic tanks. Depth to rock is also a severe limitation for septic tank absorption fields and other sanitary facilities. The windthrow is a severe hazard and tall shade trees may damage dwellings. The Rock outcrop enhances the aesthetic appeal of this complex for homesites.

The soils of this map unit are suited to most low traffic recreation uses. Blasting is generally needed to remove bedrock at sites used for intense recreation uses.

The soils of the map unit are generally not suited to small ponds because of shallow depth to rock and moderately rapid permeability.

Most areas of this map unit have large amounts of cobbles and stones that are suitable for landscaping. In some areas they may be suitable for building material.

The soils of this map unit are in capability subclass VIs and woodland ordination group 4x.

20—Gorgas-Rock outcrop complex, steep. This complex consists of steep, well drained Gorgas soils and areas of Rock outcrop on the back slopes of mountains and ridges that are underlain by sandstone. Areas are 40 or more acres and long and broad in shape. Slope ranges from 15 to 45 percent. The areas of Gorgas soils and areas of Rock outcrop are so intricately mixed, or so small, that mapping them separately was not practical.

Gorgas soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of Gorgas soils is sandy loam about 4 inches thick. The upper 2 inches is black, and the lower 2 inches is dark grayish brown. The subsoil is dark yellowish brown sandy loam about 11 inches thick. The underlying material is hard sandstone bedrock. In places, soils are similar to Gorgas soils except that they are less than 10 inches thick and are only partly covered by plants.

Rock outcrop makes up about 20 percent of the map unit. Rock outcrop consists of exposures of hard sandstone bedrock at the surface that ranges from about 10 square feet to several acres, or it is at shallow depths beneath the surface. Rock outcrop generally does not

project more than 10 feet above the ground level; in most areas it projects less than 2 feet.

The available water capacity of Gorgas soils is very low. In most years, there are frequent periods in which soil moisture is not adequate for optimum plant growth. Gorgas soils are moderately rapidly permeable and have a low shrink-swell potential. Movement of water in the soil during wet seasons is mostly lateral, downslope along the soil-rock contact, or along rock cracks immediately beneath the soil. Surface runoff is rapid. If Gorgas soils do not have a plant cover, sheet and rill erosion is a very severe hazard. The surface layer is slightly to very strongly acid.

Included in mapping are many small areas of soils similar to Gorgas soils, on knolls and low ridges, except that they have either bedrock or soft weathered sandstone at a depth of 20 to 40 inches. These soils are mainly on back slopes of Oak Mountain in the southeastern part of the county. Also included are small areas of Hanceville, Montevallo, Nauvoo, and Sullivan soils. The included soils make up about 30 percent of the map unit. Hanceville, Nauvoo, and Sullivan soils are contrasting soils, and use and management are different from Gorgas soils. These contrasting soils make up about 15 percent of the map unit.

The soils of this map unit are used mainly for woodland. A few areas are used for pasture or are in low density residential use.

The soils of this map unit are not suited to cultivated crops and are poorly suited to pasture and hay because of numerous bedrock outcrops, steep slopes, and the shallow depth to bedrock of Gorgas soil.

Gorgas soils are suited to coniferous trees, but potential productivity is moderately low because of shallow depth to rock. Numerous areas of Rock outcrop seriously limit the use of machines in preparing sites, planting, and harvesting.

The soils of this map unit have unfavorable properties for residential uses. The slope and shallow depth to bedrock severely limit grading for local roads and streets and preparing dwelling and building sites. Blasting is generally necessary to make excavations for sewers and waterlines, basements, and septic tanks. Slope and depth to rock are also severe limitations for septic tank absorption fields and other sanitary facilities.

The soils of this map unit are suited to most low traffic recreation uses. Areas of sandstone bedrock outcrop and a large variety of native vegetation contribute to the natural aesthetic appeal of this map unit.

The soils of this map unit are generally not suited to pond construction because of shallow depth to rock and moderately rapid permeability.

Most areas of this map unit have large amounts of cobbles and stones that are suitable for landscaping. In some areas, they are suitable for use as building material.

The soils in this map unit are in capability subclass VIIs and woodland ordination group 4x.

21—Gorgas-Rock outcrop-Urban land complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained Gorgas soils and areas of Rock outcrop and Urban land on the back slopes of Shades Mountain. Areas are 40 acres or more and long and broad in shape. The areas of Gorgas soils and areas of Rock outcrop and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Gorgas soils and similar soils make up about 40 percent of the map unit. Typically, the surface layer of Gorgas soils is very dark grayish brown over brown fine sandy loam about 6 inches thick. The subsoil is strong brown sandy loam about 10 inches thick. The underlying material is hard sandstone bedrock. Many areas have excavated material spread over the surface layer.

Rock outcrop makes up about 20 percent of the map unit. Rock outcrop consists of hard sandstone bedrock exposures at the surface that range from about 10 square feet to several acres, or it is at shallow depths beneath the surface.

The Urban land part of this map unit makes up about 20 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Gorgas soils is very low. In most years, there are frequent periods in which soil moisture is not adequate for optimum plant growth. Gorgas soils are moderately rapidly permeable and have a low shrink-swell potential. Movement of water in the soil during wet seasons is mostly lateral, downslope along the soil-rock contact, or along rock cracks immediately beneath the soil. Surface runoff is moderately rapid. If Gorgas soils do not have a plant cover, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is slightly to very strongly acid.

Included in mapping are small areas of Hanceville, Nauvoo, Montevallo, and Sullivan soils and soils similar to Gorgas soils except that they are underlain by hard bedrock at a depth of 20 to 40 inches. The included soils make up about 20 percent of the map unit.

The soils of this map unit are primarily in residential use. Other areas are mostly wooded or idle.

The soils of this map unit have unfavorable properties for residential uses. The shallow depth to bedrock severely limits grading for local roads and streets and preparing dwelling and building sites. Blasting is generally necessary to make excavations for sewers and waterlines, basements, and septic tanks. In some areas the natural drainage has been significantly altered by foundation excavations and blasting to install septic tanks and field lines. The windthrow hazard is severe, and tall shade trees may damage dwellings. Lawn management is difficult because of areas of Rock

outcrop. Frequent watering of lawns and gardens is necessary.

Some areas of this map unit are suited to most low traffic recreation uses. Blasting is generally needed to remove Rock outcrop for sites for intense recreation uses.

The soils in this complex are not assigned to a capability subclass or to a woodland ordination group.

22—Hanceville fine sandy loam, 8 to 15 percent slopes. This is a strongly sloping, well drained soil on mountains and ridges. It is underlain by sandstone. Slopes are convex. Slope aspect is mostly south and east. The surface is slightly dissected by small drainageways. Areas are 20 to 100 acres or more and long and narrow in shape.

Typically, the surface layer is dark brown fine sandy loam about 5 inches thick. The subsoil is more than 65 inches thick. The upper 4 inches is yellowish red fine sandy loam, and the lower 61 inches is dark red clay. In places, soils are similar to Hanceville soils except that they have weathered sandstone bedrock at a depth of 40 to 60 inches or have slopes of either less than 8 percent or more than 15 percent.

The available water capacity of this soil is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Permeability and the shrink-swell potential are moderate. Surface runoff is moderately rapid. If this soil is cultivated, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is strongly acid to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are small areas of Gorgas, Montevallo, and Nauvoo soils and small areas of sandstone bedrock outcrop that are near the edges of areas of Hanceville soils. The included soils make up about 25 percent of the map unit. Gorgas and Montevallo soils are contrasting soils, and use and management are different from Hanceville soils. These contrasting soils make up about 15 percent of the map unit.

This soil is used primarily for pasture and woodland. Some areas are used for residential units.

This soil is suited to cultivated crops. Slope and the hazard of erosion are limitations. Plant cover is needed three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are suited to this soil; their potential productivity is moderately low. There are no significant management concerns.

This soil has favorable properties for residential uses. However, some grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Grading can be minimized if streets are laid out laterally along the mountaintops and extended toward the mountainsides. Low strength is a limitation for local roads and streets. For areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread over the area. Septic tank absorption fields function well on this deep soil. Slope is a severe limitation for small commercial buildings. Some large structures can be adapted to this soil by orienting the longest dimension parallel with the mountaintop.

This soil is suited to most recreation uses. In many areas, grading is needed for sites for intense recreation uses. The surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Sites for pond construction are few on this soil. Seepage is a moderate limitation because of the moderately permeable subsoil.

This Hanceville soil is in capability subclass IVe and in woodland ordination group 4o.

23—Hanceville-Urban land complex, 2 to 8 percent slopes. This complex consists of gently sloping to sloping, well drained Hanceville soils and areas of Urban land on mountains and ridges that are underlain by sandstone. Slope aspect is mostly south and east. Areas are 40 acres or more and are long and narrow in shape. The areas of Hanceville soils and areas of Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Hanceville soils and similar soils make up about 55 percent of the map unit. Typically, the surface layer is dark reddish brown fine sandy loam about 6 inches thick. The subsoil is more than 64 inches thick. The upper 6 inches is dark red sandy clay loam, and the lower 58 inches is dark red clay. Many areas have been altered either by grading or by having excavated subsoil spread over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Hanceville soils is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Permeability and the shrink-swell potential are moderate. Surface runoff is moderately slow. If these soils do not have a plant cover, sheet and rill erosion is a moderate hazard. The surface layer is strongly acid to very strongly acid.

Included in mapping are small areas of Gorgas, Montevallo, and Nauvoo soils and small areas of sandstone bedrock outcrop that are commonly near the edge of Hanceville soils. The included soils and bedrock outcrops make up less than 15 percent of the map unit.

Gorgas and Montevallo soils are contrasting soils, and use and management are different from Hanceville soils. These inclusions make up about 10 percent of the map unit.

Most of the acreage of this map unit is used for residential and commercial facilities. Small areas are mostly wooded or idle.

Hanceville soils have favorable properties for residential uses. In some areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a limitation for local roads and streets. Plant growth is difficult to maintain on areas where the surface layer has been removed or where excavated subsoil has been spread over the surface. Vegetation on these areas needs frequent watering. For areas where the surface layer was stockpiled and respread over the excavated subsoil, plant growth is easy to maintain, and the need for watering plants is minimal. Septic tank absorption fields function well on this soil. Hanceville soils are suited to small commercial buildings; only small amounts of cutting and filling are needed on this gently sloping soil.

Hanceville soils are well suited to most recreation uses. In some areas, grading is needed for sites for intense recreation uses. The surface layer should be removed before grading, stockpiled, and respread over the area to provide a good rooting medium for plant growth.

This map unit is not assigned to a capability subclass or to a woodland ordination group.

24—Holston loam, 2 to 8 percent slopes. This is a gently sloping to sloping, well drained soil on colluvial fans, toe slopes, and stream terraces. Slopes are convex. The surface is dissected by drainage from surrounding uplands. Areas are 10 to 100 acres or more and are irregular in shape.

Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsoil is more than 59 inches thick. The upper 20 inches is yellowish brown loam, the next 8 inches is strong brown clay loam, and the lower 31 inches is strong brown loam that has red and brown mottles. In some places, soils are similar to Holston soils except that they are 50 to 60 inches thick, or they have slopes of either less than 2 or more than 8 percent.

The available water capacity of this soil is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Albertville, Allen, Docena, Sullivan, and Townley soils. Docena and Sullivan soils are located in drainageways, depressions, and low areas. Albertville and Townley soils are on shale ridges and knolls. Allen soils are the most extensive included soils. The included soils make up about 35 percent of the map unit. Albertville, Docena, Sullivan, and Townley soils are contrasting soils, and use and management are different from Holston soils. These contrasting soils make up about 15 percent of the map unit.

This soil is used primarily for pasture and hay. Some areas are used for cultivated crops. Many areas of this soil along the roadsides are in low density residential use.

This soil is suited to cultivated crops. Slope and the hazard of erosion are limitations. Plant cover is needed half of the time. Terracing, contour stripcropping, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbed can be prepared by minimum tillage. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are suited to this soil, and the potential productivity is moderately high. There are no significant management concerns.

The properties of this soil are favorable for residential and industrial uses. Low strength is a moderate limitation for local roads and streets. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants. Because this is a gently sloping to sloping soil, only minimal cutting and filling are needed. Septic tank absorption fields function well on this soil.

This soil is well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses. The surface layer should be removed before grading, stockpiled, and respread to provide a good rooting medium for plants.

Few potential sites for pond construction exist on this soil. Seepage is a moderate limitation.

This Holston soil is in capability subclass IIe and in woodland ordination group 3o.

25—Holston-Urban land complex, 2 to 8 percent slopes. This complex consists of gently sloping to sloping, well drained Holston soils and areas of Urban land on colluvial fans, toe slopes, and high stream terraces. Areas are 40 acres or more and are irregular in shape. The areas of Holston soils and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Holston soils and similar soils make up about 40 percent of the map unit. Typically, the surface layer is very dark grayish brown loam about 6 inches thick. The subsoil is more than 59 inches thick. The upper 20 inches is yellowish brown loam, the next 8 inches is strong brown clay loam, and the lower 31 inches is

strong brown loam that has red and brown mottles. Many areas have been altered either by grading or by having excavated subsoil spread over the surface layer.

The Urban land part of this complex makes up about 40 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Holston soils is high. However, in most years, there are brief periods in which soil moisture is not adequate for optimum plant growth. Holston soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately slow. If these soils do not have a plant cover, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid.

Included in this complex are small areas of Albertville, Allen, Docena, Etowah, Nauvoo, Sullivan, and Townley soils. A few areas of highly urbanized Etowah soils in the Leeds and Trussville areas are included. The inclusions make up less than 20 percent of the map unit.

The Holston soils are primarily in residential and commercial uses. Other areas are idle or wooded.

The properties of Holston soils are favorable for residential and industrial use. In some areas, grading is needed for local roads and streets and for small commercial building and dwelling sites. Low strength is a moderate limitation for local roads and streets. Septic tank absorption fields function well on these soils. Plant growth is difficult to maintain on areas where the surface layer has been removed or where excavated subsoil has been spread over the surface layer. Plants in these areas generally need frequent watering during dry weather. On areas where the surface layer was stockpiled and respread over the excavated soil, plants are easy to maintain, and the need for watering them is minimal.

Holston soils are well suited to most recreation uses. In some areas, grading is needed for site preparation for intense recreation uses. The surface layer should be removed before grading, stockpiled, and respread to provide a good rooting medium for plants.

This map unit was not assigned to a capability subclass or a woodland ordination group.

26—Ketona-Sullivan complex, 0 to 4 percent slopes. This complex consists of gently sloping, poorly drained Ketona soils and well drained Sullivan soils in oval depressional areas, primarily sinkholes, of limestone valleys. Slopes are concave. Most areas do not have outlets for surface drainage. Areas are 20 to 60 acres and circular in shape. The areas of Ketona and Sullivan soils are so intricately mixed, or so small, that mapping them separately was not practical.

Ketona soils make up about 50 percent of the map unit. Typically, the surface layer is grayish brown silt loam about 6 inches thick. The subsoil is about 35 inches thick. The upper 9 inches is mottled light brownish gray and yellowish brown silty clay loam; the next 11 inches is mottled gray, brown, and yellowish brown silty clay; and the lower 15 inches is gray silty clay that has yellowish brown mottles. The underlying material is limestone and chert rock.

Sullivan soils and similar soils make up about 40 percent of the map unit. Typically, the surface layer of Sullivan soil is dark yellowish brown silt loam about 6 inches thick. The subsoil is about 46 inches thick. The upper 14 inches is reddish brown silt loam, the next 4 inches is brown silt loam, the next 6 inches is yellowish brown silty clay loam, and the lower 22 inches is mottled yellowish brown and gray silty clay loam. The underlying material is mottled silty clay. In places, the soils are similar to Sullivan soils except that they are not as well drained.

The available water capacity is moderate for Ketona and Sullivan soils, and soil moisture is adequate for optimum plant growth. Ketona soils are slowly permeable and have a high shrink-swell potential. Sullivan soils are moderately permeable and have a low shrink-swell potential. Surface runoff is slow. These soils have a high water table during the winter and spring. Ketona soils are subject to ponding, and Sullivan soils are subject to frequent, brief flooding. Many areas do not have surface drainage outlets; surface runoff is removed by percolation through the soil and substratum. In some areas, the basins are impervious and water is ponded during most of the year. If these soils are cultivated, sheet and rill erosion is a slight hazard. The surface layer is strongly acid to moderately alkaline. Ketona soils can be cultivated within a narrow range in moisture content. Sullivan soils can be tilled within a wide range in moisture content.

Included in mapping are small areas of Bodine, Etowah, Fullerton, and Tupelo soils on adjacent uplands. Use and management of the included soils are different from Ketona and Sullivan soils. Included soils make up about 10 percent of the map unit.

The soils of this complex are used primarily as woodland. Some areas are used for pasture and hay, and a few areas are used for cultivated crops. A few areas are in residential use.

These soils are suited to cultivated crops. The seasonal high water table and ponding are limitations. Subsurface and surface drainage help to remove ponded water and lower the seasonal high water table. However, most areas of these soils have poor drainage outlets. Crops grown on these soils should be tolerant of ponded water; and on Ketona soils, tolerant of wetness.

These soils are well suited to pasture and hay. Fertilizing and harvesting are dependent on soil wetness. Deferred grazing during wet periods helps prevent some soil compaction by livestock.

Coniferous and deciduous trees are suited to these soils; the potential productivity is moderately high to high. Wetness limits woodland management and

harvesting. This can be partly overcome by harvesting during dry seasons.

These soils are in sinkholes and are not favorable for residential and industrial uses because of the risk of additional caving and the poor surface drainage outlets. The presence of sinkholes indicates that the soils are underlain by cavernous limestone, and the hazard of caving may exist. Onsite investigation for this hazard is recommended for sites for any new residential, industrial, or commercial uses.

Some areas of these soils can be used for several kinds of recreation areas with little or no fill. Location of individual facilities should consider the ponding hazard at the site.

Many areas of Ketona soils in this map unit are suitable for pond construction. Because these soils are underlain by cavernous limestone, seepage is a limitation.

The soils of this map unit are in capability subclass IVw. The Ketona soils are in woodland ordination group 3w, and the Sullivan soils are in woodland ordination group 2w.

27—Leesburg-Rock outcrop complex, steep. This complex consists of steep, well drained Leesburg soils and areas of Rock outcrop on the steep, scarp sides of Shades Mountain and other mountains that consist of tilted layers of sandstone and shale. Slopes range from 15 to 45 percent in most areas. Slope lengths range from 500 to 2,500 feet. Elevation ranges from 200 to 500 feet. Most areas of these soils are on the northwest side of mountains in the southeastern part of the county. The areas of Leesburg soils and areas of Rock outcrop are so intricately mixed, or so small, that mapping them separately was not practical.

Leesburg soils and similar soils, on the middle and lower slopes of scarp sides, make up about 60 percent of the map unit. Typically, the surface layer of Leesburg soils is very dark grayish brown cobbly fine sandy loam about 4 inches thick. The subsoil is about 62 inches thick. The upper 21 inches is yellowish brown cobbly fine sandy loam; the next 15 inches is strong brown cobbly sandy clay loam; and the lower 26 inches is silty clay loam, mottled in shades of red, brown, and gray. In places, soils are similar to Leesburg soils except that they are stony, have a redder subsoil, contain fewer fragments, or have weathered shale at depths of 40 to 60 inches and are commonly on the upper slopes of scarp sides.

Rock outcrop makes up about 15 percent of the map unit. Rock outcrop consists of exposures of hard sandstone bedrock that range from about 10 square feet to several acres in size. Rock outcrop generally does not project more than 10 feet above the ground level; in most areas it projects less than 2 feet (fig. 7) above ground level.

The available water capacity of Leesburg soils is moderate. However, in most years, there are periods in which soil moisture is not adequate for optimum plant growth. Leesburg soils are moderately permeable and have a low shrink-swell potential. Surface runoff is rapid. If Leesburg soils do not have a plant cover, sheet and rill erosion is a very severe hazard. The surface layer of Leesburg soils is strongly to very strongly acid. If some areas of these soils are disturbed by construction, they are subject to landslide.

Included in mapping are many small areas of Allen, Gorgas, Hanceville, Holston, Montevallo, Nauvoo, Sullivan, and Townley soils. Allen and Holston soils contain fewer fragments and are on mountain foot slopes. Hanceville soils have a dark red, clayey subsoil and are on the mountaintops. Gorgas soils are shallow and underlain by sandstone bedrock. Gorgas soils are closely associated with areas of sandstone bedrock outcrop and are commonly near the mountaintops and on the middle and lower sides of mountains. Nauvoo and Townley soils are on benches, knolls, and ridges where geologic erosion has removed the blanket of colluvium. Montevallo soils are on steep areas. Sullivan soils are in parallel narrow drainageways. The included soils make up about 25 percent of the map unit.

The soils of this map unit are used primarily as woodland. A few areas are in residential and commercial uses.

The soils of this map unit are not suited to cultivated crops, pasture, and hay because of the steep slopes, the hazard of erosion, and the surface stones and areas of Rock outcrop.

The soils of this map unit are suited to deciduous and coniferous trees, and the potential productivity is moderately high. These soils are dominated by chestnut oak. Harvesting, preparing sites, and planting are limited by the steep slopes, surface stones and boulders, and cliffs and ledges of sandstone bedrock. Constructing and maintaining roads for logging, loading areas, and fire lanes are difficult on these soils. Poor harvesting techniques can cause severe erosion.

The soils of this map unit are not favorable for residential and industrial uses because of steep slopes. If these soils do not have a plant cover, they are subject to landslides. Extensive excavation is needed to build houses on these soils, and soil loss is a severe hazard.

The soils of this map unit are suited to most low traffic recreation uses. Areas of sandstone bedrock cliffs and ledges, broken rock piles, and native plants and shrubs contribute to the natural aesthetic appeal of this map unit. Few sites are suitable for pond construction.

The soils of this map unit are in capability subclass VIIs and in woodland ordination group 3r.

28—Montevallo-Nauvoo-Urban land complex, steep. This complex consists of steep, well drained Montevallo and Nauvoo soils and Urban land on strongly dissected areas of sandstone and shale plateaus. The areas of the soils and Urban land are so intricately

Figure 7.—The sandstone bedrock outcrop in an area of Leesburg-Rock outcrop complex, steep, is a barrier to easy access in many areas.

mixed, or so small, that mapping them separately was not practical. Areas are 40 or more acres and irregular in shape. Slope ranges from 10 to 40 percent in most areas.

Montevallo soils and similar soils make up about 35 percent of the map unit. Typically, the surface layer of Montevallo soils is very dark grayish brown shaly silt loam about 4 inches thick. The subsoil is strong brown shaly silt loam about 12 inches thick. The underlying material is weathered shale.

These soils are on steep scarp slopes and sides of ridges. Many areas have been altered by deposits of material excavated from the soils on the ridges.

Nauvoo soils and similar soils make up about 20 percent of the map unit. Typically, the surface layer of Nauvoo soils is dark grayish brown fine sandy loam about 5 inches thick. The subsoil is clay loam about 45 inches thick. The upper 7 inches is brownish yellow, and the lower 38 inches is yellowish red. The underlying material is highly weathered sandstone.

These soils are on the back slopes of mountains and ridges. Many areas have been altered by grading or by having excavated subsoil spread over the surface layer.

Urban land makes up about 20 percent of this map unit. The areas, located mostly on ridges, are covered by houses, streets, and driveways.

The available water capacity is very low for Montevallo soils and moderate for Nauvoo soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. These periods are longer for Montevallo soils. Both soils are moderately permeable and have a low shrink-swell potential. Surface runoff is rapid for Montevallo soils and moderately rapid for Nauvoo soils. If these soils do not have plant cover, sheet and rill erosion is a very severe hazard for Montevallo soils and a severe hazard for Nauvoo soils. Unless limed, the surface layer of both soils is strongly to very strongly acid.

Included in mapping are areas of Allen, Docena, Gorgas, Hanceville, Holston, State, Sullivan, and

Townley soils. The included soils make up about 25 percent of the map unit.

The soils of this map unit are primarily in residential use. Other areas are used mostly for woodland and low traffic recreation.

Montevallo soils are not favorable for residential and industrial uses because of the steep slopes and shallow depth of soil. Slope and depth to rock are severe limitations for septic tank absorption fields. These limitations are difficult to overcome and septic tank failures are common. Plant growth is difficult to maintain on the steep Montevallo soils. Use of the soil around homesites is extremely limited. Native trees, shrubs, and vines and nonvegetative mulch are preferable for landscaping homesites.

Nauvoo soils are favorable for residential uses. Most residential sites on this complex are built on Nauvoo soils. Residential use is affected primarily by slope. Although slope and depth to bedrock are moderate limitations, septic tank absorption fields function well on these soils. Plant growth is difficult where excavated subsoil has been spread over the surface layer. Plants on these areas generally need frequent watering. In areas where the surface layer was stockpiled and respread over the excavated subsoil, plant growth is easy to maintain, and the need for watering plants is minimal.

Areas of the complex used for woodland are on steep Montevallo soils and similar soils. Management of these areas for timber production is difficult because residential units make these areas poorly accessible. Deciduous trees are favorable where the wood is used in heating of homes.

The soils of this map unit were not assigned to a capability subclass or to a woodland ordination group.

29—Montevallo-Nauvoo association, steep. This map unit consists of soils on strongly dissected areas of sandstone and shale plateaus in the northern and western parts of the county. Extensive surface and deep mining of coal occur in this area. The underlying layers of sandstone, siltstone, shale, and coal are nearly level. The ridges are commonly underlain by sandstone, and the side slopes are generally underlain by shale and siltstone. The soils are in a regular pattern that is closely related to landscape position and underlying parent material. Areas of this map unit are large. Slope ranges from 6 to 55 percent.

Montevallo soils, on the steep sides of ridges, make up about 40 percent of the map unit. Typically, the surface layer is very dark gray shaly silt loam and dark grayish brown shaly silt loam about 6 inches thick. The subsoil is yellowish brown very shaly silt loam about 10 inches thick. The underlying material is weathered siltstone and shale (fig. 8). The slope of Montevallo soils in this map unit is generally more than 15 percent.

Nauvoo soils, on ridgetops and ridge sides, make up about 25 percent of most areas. Typically, the surface layer is dark grayish brown fine sandy loam about 6 inches thick. The subsoil is about 36 inches thick. The upper 6 inches is yellowish brown fine sandy loam, and the lower 30 inches is yellowish red clay loam. The underlying material is soft, highly weathered sandstone. The slope of Nauvoo soils in this map unit is generally 6 to 15 percent.

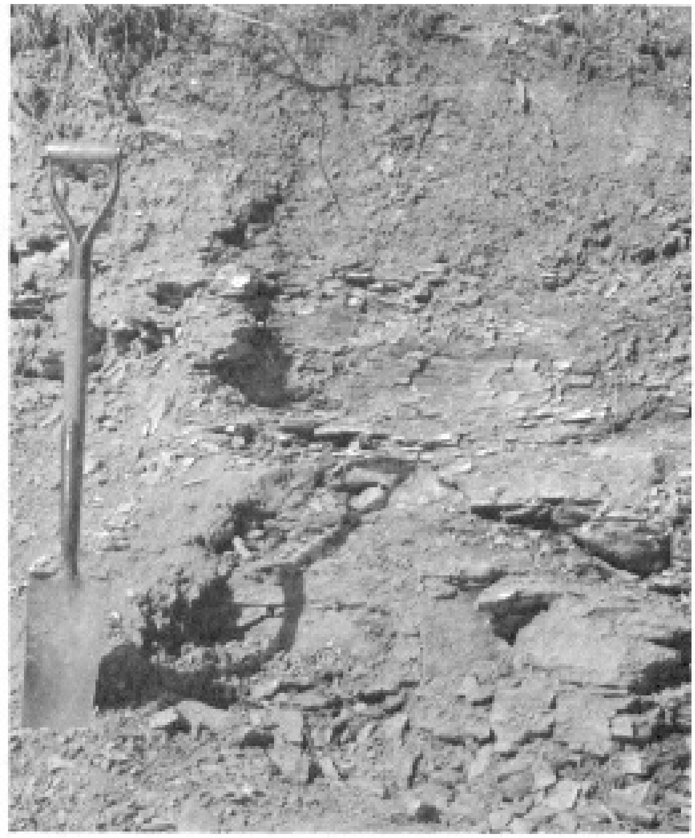


Figure 8.—Profile of shallow Montevallo soils showing the underlying weathered siltstone and shale in an area of Montevallo-Nauvoo association, steep.

The available water capacity is very low for Montevallo soils and moderate for Nauvoo soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. These periods are longer for Montevallo soils. Both soils are moderately permeable and have a low shrink-swell potential. Surface runoff is rapid for Montevallo soils and moderately rapid for Nauvoo soils. If these soils do not have a plant cover, sheet and rill erosion is a very severe hazard for Montevallo soils and a severe hazard for Nauvoo soils. The surface layer of both soils is strongly acid to very strongly acid. Nauvoo soils can be tilled within a wide range in moisture content.

Minor soils in this association are Allen, Docena, Gorgas, Holston, State, Sullivan, and Townley soils. Also

some areas have sandstone bedrock outcrop, and a few areas have been surface mined for coal. Allen and Holston soils are on fans, foot slopes, and toe slopes. Docena, State, and Sullivan soils are in depressions, drainageways, and on flood plains. Gorgas soils are on side slopes. Townley soils, the most extensive of the minor soils, are on ridgetops and upper sides of ridges; slope ranges from 10 to 25 percent. These minor soils and Rock outcrop make up about 35 percent of the map unit.

The soils of this map unit are used primarily for woodland. Many small areas have been altered by surface mining of coal. A few small areas are used for cultivated crops and pasture.

Montevallo soils are not suited to cultivated crops, pasture, or hay because of steep slopes, the hazard of erosion, and shallow soil depth. Areas of Nauvoo soils and the minor Townley soils are suited to these uses, but they are limited by slope and the hazard of erosion. Areas of these soils are generally long and narrow, small, and poorly accessible.

The soils of this map unit are suited to woodland use. Suitable species, productivity potential, and management problems are variable.

Montevallo soils are suited to coniferous trees, and the potential productivity is moderate. However, the steep slopes and shallow soil depth are limitations. During wet seasons, windthrow of trees is a moderate hazard. Constructing and maintaining roads for logging, loading areas, and fire lanes is difficult on these soils. Poor harvesting techniques can cause severe erosion.

Nauvoo soils are well suited to coniferous and deciduous trees, and the potential productivity is moderate to high. There are no significant management concerns. These soils are well suited to constructing and maintaining roads for logging, loading areas, and fire lanes. If grading is necessary for loading areas, stockpiling of the surface layer material and respreading it after harvest will help vegetation restoration.

Montevallo soils are not favorable for residential and industrial uses because of steep slopes and shallow soil depth. Septic tank effluent may flow out to the surface because of pressure caused by elevation difference, or it may flow laterally or downslope through rock cracks, and then surface around residential units at a lower elevation. Plant growth is difficult to maintain on the steep, shallow Montevallo soils. Extensive excavation is needed to prepare dwelling sites on these soils, and potential soil loss is severe. Nauvoo soils are favorable for residential and industrial uses, but slope is a limitation. Also, areas of Nauvoo soils and the included Townley soils are generally long and narrow and are poorly accessible.

The soils of this map unit are suited to most low traffic recreation uses. Nauvoo soils are better suited to most recreation facilities than Montevallo soils.

A few sites are suitable for pond construction. Many areas of Montevallo soils have suitably shaped basins. However, these soils are shallow in depth and have poor reservoir basins. In such basins, excessive seepage may occur through rock cracks and old root channels. Also, suitable soil material for dams is not available.

Surface and subsurface mining of coal is extensive in many areas of these soils. Reclaiming these soils after surface mining operations is difficult because of the remaining steep slopes, the droughty nature of rock spoil, and the wide variation of reaction. Grading and reapplying topsoil will help reduce these problems. Most of the needed topsoil can be stockpiled onsite before mining. Montevallo soils are a poor source of topsoil because they are shallow and have steep slopes. A much thicker layer of topsoil can be obtained from some minor soils, primarily Nauvoo, Allen, and Holston soils. The loamy subsoil of these soils can be modified for suitable rooting medium by applying lime and fertilizer and by minimizing tillage.

The Montevallo soils are in capability subclass VIIe and in woodland ordination group 4d. The Nauvoo soils are in capability subclass IVe and in woodland ordination group 2o.

30—Nauvoo fine sandy loam, 2 to 8 percent slopes. This is a gently sloping to sloping, well drained soil on medium to broad ridgetops and upland plateaus that are underlain by sandstone. Slopes are convex. The landscape also has a few small, upland drainageways, and some areas have weakly expressed knolls and depressions. Areas are 20 to 200 acres or more and irregular in shape.

Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is about 42 inches thick. The upper 5 inches is strong brown loam; the next 18 inches is yellowish red sandy clay loam; and the lower 19 inches is mottled yellowish red, red, and yellowish brown sandy clay loam. Below the subsoil is about 4 inches of loam mottled in shades of red, brown, and yellow. The underlying material is highly weathered, red and yellow sandstone. In places, the soils are similar to Nauvoo soils except that the subsoil is yellower, the soil is 50 to 60 inches thick, or the depth to weathered sandstone is 60 to 70 inches. In some places, the slope is more than 8 percent.

The available water capacity of this soil is moderate. However, in most years there are periods during the growing season in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately slow. If this soil is cultivated, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Docena, Gorgas, Montevallo, Sullivan, and Townley soils. Also

included are soils that are similar to the Nauvoo soil except that they have a moderately slowly permeable subsoil or are 40 to 60 inches deep to hard bedrock. The included soils make up about 20 percent of the map unit. Docena, Gorgas, Montevallo, and Sullivan soils are contrasting soils, and use and management are different from Nauvoo soils. These contrasting soils make up about 15 percent of most areas.

This soil is used primarily for cultivated crops, pasture, and hay crops. Many areas adjacent to roads are used for residential sites.

This soil is well suited to cultivated crops. Slope and the hazard of erosion are limitations (fig. 9). Plant cover is needed half of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil, and the potential productivity is high. There are no significant management concerns.

This soil has many favorable properties for residential uses. Low strength is a moderate limitation for local roads and streets. In areas that are to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants. Septic tank absorption fields function well on this soil. This gently sloping to sloping soil is favorable for industrial and commercial sites because only a small amount of cutting and filling is needed.

This soil is well suited to most recreation uses. In some areas, grading is needed for sites for intense recreation uses. The surface layer should be removed before grading, stockpiled, and respread to provide a good rooting medium for plants.

Many sites for pond construction exist on this soil. Seepage and the underlying highly weathered sandstone are moderate limitations. To minimize the risk of seepage, construction materials should not be removed from the reservoir floor.

This Nauvoo soil is in capability subclass IIe and in woodland ordination group 2o.

31—Nauvoo fine sandy loam, 8 to 15 percent slopes. This is a strongly sloping, well drained soil on ridges and upland plateaus that are underlain by sandstone. The landscape in some places is small knolls

Figure 9.—Soybeans growing on Nauvoo fine sandy loam, 2 to 8 percent slopes.

and depressions that have a few, small upland drainageways. Slopes are convex. Areas are 20 to 100 acres or more and irregular in shape.

Typically, the surface layer is very dark grayish brown and dark brown fine sandy loam about 7 inches thick. The subsurface layer is yellowish brown fine sandy loam about 5 inches thick. The subsoil is yellowish red clay loam about 22 inches thick. The layer below the subsoil is about 12 inches of red and yellow sandy loam that has a relict rock structure. The underlying material is highly weathered, red and yellow sandstone. In places, soils are similar to Nauvoo soils except that they have a yellower subsoil, or soil is 50 to 60 inches thick, or the depth to weathered sandstone is 60 to 72 inches, or slopes are either less than 8 or more than 15 percent.

The available water capacity of this soil is moderate. However, in most years there are periods in which soil moisture is not adequate for optimum plant growth. Permeability is moderate, and the shrink-swell potential is low. Surface runoff is moderately fast. If this soil is cultivated, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is strongly acid to very strongly acid. This soil can be tilled within a wide range in moisture content.

Included with this soil in mapping are areas of Docena, Gorgas, Montevallo, Sullivan, and Townley soils. Also included are soils somewhat similar to Nauvoo soils except that they have either a moderately slowly permeable subsoil or hard bedrock at 40 to 60 inches. The included soils make up about 20 percent of most areas.

This soil is used primarily for pasture and woodland. Many areas adjacent to roads are in residential use.

This soil is suited for cultivated crops. Plant cover is needed three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage except in small eroded areas where part of the subsoil has been mixed with the plow layer. Crops respond well to irrigation.

This soil is well suited to pasture and hay. There are no significant management concerns.

Coniferous and deciduous trees are well suited to this soil, and the potential productivity is high. There are no significant management concerns.

This soil has many favorable properties for residential uses. Some grading, cutting and filling, and excavating are needed for local roads and streets and for dwellings. Grading can be minimized if streets are laid out laterally along the ridgetops toward drainageways. Low strength is a moderate limitation for local roads and streets. In areas to be cut and filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants. Septic tank absorption fields function well on this deep soil. The strong slope limits the use of the soil for industrial and commercial facilities because a considerable amount of cutting and filling is needed. Some structures can be adapted to this soil by orienting the longest dimension parallel with the ridgetop.

This soil is suited to most recreation uses. In most areas, grading is needed for site preparation for intense recreation uses. In these areas, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Many potential sites for pond construction exist on this soil. Seepage and the underlying highly weathered sandstone are moderate limitations. To minimize the risk of seepage, construction materials should not be removed from the reservoir floor.

This Nauvoo soil is in capability subclass IVe and in woodland ordination group 2o.

32—Nauvoo-Urban land complex, 2 to 8 percent slopes. This complex consists of gently sloping to sloping, well drained Nauvoo soils and areas of Urban land on medium to broad ridgetops and upland plateaus that are underlain by sandstone. Areas are 40 acres or more and irregular in shape. The areas of Nauvoo soils and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Nauvoo soils and similar soils make up about 55 percent of the map unit. Typically, the surface layer is dark grayish brown fine sandy loam about 4 inches thick. The subsoil is about 42 inches thick. The upper 5 inches is strong brown loam; the next 18 inches is yellowish red sandy clay loam; and the lower 19 inches is mottled yellowish red, red, and yellowish brown sandy clay loam. The layer below the subsoil is about 4 inches of loam mottled in shades of red, brown, and yellow. The underlying material is highly weathered, red and yellow sandstone. Many areas of this soil have been altered either by grading or by spreading excavated subsoil over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. The areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Nauvoo soils is moderate. However, in most years there are periods during the growing season in which soil moisture is not adequate for optimum plant growth. Nauvoo soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately slow. If these Nauvoo soils do not have plant cover, sheet and rill erosion is a moderate hazard. Unless limed, the surface layer is strongly acid to very strongly acid.

Included in mapping are small areas of Docena, Gorgas, Montevallo, Sullivan, and Townley soils. These inclusions make up less than 15 percent of most areas.

Most of the acreage of this map unit is used for residential and commercial structures. Other areas are wooded or idle.

Nauvoo soils have many favorable properties for residential uses. In some areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a moderate limitation for local roads and streets. Plants are difficult to maintain where excavated subsoil has been spread over the surface layer. Plants on these areas generally need frequent watering. For areas where the surface layer was stockpiled and respread, plants are easy to maintain, and the need for watering plants is minimal. Septic tank absorption fields function well on the Nauvoo soils. The gently sloping Nauvoo soils are favorable for small commercial buildings because only a small amount of cutting and filling is needed.

Nauvoo soils are well suited to most recreation uses. In some areas, grading is needed for sites for intense recreation uses. In these areas, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

This map unit is not assigned to a capability subclass or to a woodland ordination group.

33—Nauvoo-Urban land complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained, Nauvoo soils and areas of Urban land on ridgetops and upland plateaus that are underlain by sandstone. Areas are 40 or more acres and irregular in shape. The areas of Nauvoo soils and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Nauvoo soils and similar soils make up about 55 percent of the map unit. Typically, the surface layer is very dark grayish brown and dark brown fine sandy loam about 7 inches thick. The subsurface layer is yellowish brown fine sandy loam about 5 inches thick. The subsoil is about 22 inches thick. It is yellowish red clay loam. The layer below the subsoil is about 12 inches of red and yellow sandy loam that has a relict rock structure. The underlying material is weathered, red and yellow sandstone. Many areas of these soils have been altered either by grading or by spreading excavated subsoil over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. Areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Nauvoo soils is moderate. However, in most years there are periods during the growing season in which soil moisture is not adequate for optimum plant growth. Nauvoo soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately rapid. If Nauvoo soils do not have a plant cover, sheet and rill erosion is a severe hazard. Unless limed, the surface layer is strongly acid to very strongly acid.

Included in mapping are small areas of Docena, Gorgas, Montevallo, Sullivan, and Townley soils. These inclusions make up about 15 percent of the map unit.

Most of the acreage of this map unit is used for residential and commercial structures. Some small areas are wooded or idle.

Nauvoo soils have many favorable properties for residential uses. In most areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a moderate limitation for local roads and streets. Plants are difficult to maintain where excavated subsoil has been spread over the surface layer. Plants in these areas generally need frequent watering. For areas where the surface layer was stockpiled and respread, plants are easy to maintain, and the need for watering plants is minimal. Septic tank absorption fields function well on these deep Nauvoo soils. The strong slope is a severe limitation for small commercial buildings; moderate amounts of cutting and filling are needed.

Nauvoo soils are suited to most recreation uses. In most areas, grading is needed for site preparation for intense recreation uses. In these areas, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

This map unit is not assigned to a capability subclass or to a woodland ordination group.

34—Nauvoo-Montevallo association, steep. This map unit consists of Nauvoo and Montevallo soils on strongly dissected, steep areas that are underlain by sandstone and shale. They are in the southeastern part of the county. Some surface and deep mining of coal occurs in this area. The underlying layers of sandstone, siltstone, shale, and coal layers are tilted and dip strongly to the southeast. The soils in this association are in a regular pattern that is closely related to landscape position and underlying parent materials. Areas of these soils are large. Slope ranges from 10 to 40 percent.

The landscape consists of numerous linear, roughly parallel, low mountains and ridges that extend from the southwest to the northeast across the county. Soils on the southeastern side (back slope) of the mountains and ridges are generally underlain by sandstone, and these soils have slopes that are not as steep as those of soils on the northwestern side (scarp slope). Soils on the scarp slopes are underlain by shale and siltstone.

Nauvoo soils and similar soils, on the back slopes of the mountain ridges, make up about 35 percent of the map unit. Typically, the surface layer of Nauvoo soils is dark grayish brown fine sandy loam about 5 inches thick. The subsoil is clay loam about 45 inches thick. The upper 7 inches is brownish yellow, and the lower 38 inches is yellowish red. The underlying material is weathered sandstone. The slope of Nauvoo soils in this map unit is dominantly 10 to 15 percent but ranges up to 25 percent in some areas. In some places, soils are similar to Nauvoo soils except that they are underlain by sandstone bedrock or have clayey subsoil.

Montevallo soils and similar soils, on the scarp slopes, make up about 25 percent of the map unit. Typically, the surface layer of Montevallo soils is very dark gray, shaly silt loam about 4 inches thick. The subsoil is strong brown, shaly silt loam about 12 inches thick. The underlying material is weathered shale. The slope of Montevallo soils in this map unit is generally more than 25 percent. In some places, soils are similar to Montevallo soils except that they are underlain by weathered sandstone and are located on steep areas on the back slopes.

The available water capacity is moderate for Nauvoo soils and very low for Montevallo soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. These periods are longer for Montevallo soils. Both soils are moderately permeable and have a low shrink-swell potential. If these soils do not have a plant cover, sheet and rill erosion is a severe hazard for Nauvoo soils and a very severe hazard for Montevallo soils. The surface layer of both soils is strongly acid to very strongly acid. Nauvoo soils can be tilled within a wide range in moisture content.

Minor soils in this association are Allen, Docena, Gorgas, Holston, State, Sullivan, and Townley soils. Also, some areas of sandstone bedrock outcrop. These soils and Rock outcrop generally make up about 40 percent of the map unit. Allen and Holston soils are on fans, foot slopes, and toe slopes. Docena, State, and Sullivan soils are in depressions, drainageways, and on flood plains. Gorgas soils and Rock outcrop are on the northwest side of some mountaintops and ridgetops and near drainageways on the back slope of some mountains. Townley soils, the most extensive of the minor soils, are primarily on upland scarp slopes; slopes range from 10 to 25 percent.

The soils of this association are used primarily as woodland. A few small areas are used for pasture or residential uses.

Montevallo soils are not suited to cultivated crops, pasture, and hay because of the steep slopes, the hazard of erosion, and shallow soil depth. Areas of Nauvoo soils and the included Townley soils are suited to these uses, but slope and the hazard of erosion are limitations. Areas of these soils also are generally long and narrow, small, and poorly accessible.

The soils of this map unit are suited to woodland use. Suitable species, productivity potential, and management problems are variable.

Montevallo soils are well suited to coniferous trees; the potential productivity is moderate. Limitations include steep slopes and shallow soil depth. During wet seasons, windthrow of trees is a moderate hazard. Constructing roads for logging, loading areas, and fire lanes is difficult on these soils. Poor harvesting techniques can cause severe erosion.

Nauvoo soils are suited to coniferous trees; the potential productivity is moderate to high. Coniferous trees are generally favored in management. Slope is the only significant concern in management. These soils are well suited to be used for constructing and maintaining roads for logging, loading areas, and fire lanes. If grading is necessary for loading areas, stockpiling of the surface layer material and respreading it after harvest will help site restoration.

Montevallo soils are not favorable for residential and industrial uses because of steep slopes and shallow soil depth. Septic tank effluent may flow out on the surface because of pressures caused by elevation difference, or it may flow laterally through rock cracks and then surface around residential units at lower elevations. Plant growth is difficult to maintain on the steep, shallow Montevallo soils. Extensive excavation is needed to prepare dwelling sites on these soils, and the hazard of soil loss during construction is severe. Nauvoo soils are favorable for residential and industrial uses, but slope is a limitation.

The soils of this map unit are suited to most low traffic recreation uses. Nauvoo soils are better suited to most recreation facilities than Montevallo soils.

A few sites are suitable for pond construction. Many areas of Montevallo soils have suitably shaped basins. However, these soils are shallow in depth and have poor reservoir basins. Excessive seepage occurs through rock cracks and old root channels. Also, suitable soil material for dams is not available. These soils are in a large portion of the watershed that is involved in municipal water supply. Planning of land use should give adequate consideration to water quality and to controlling soil loss.

Surface and subsurface mining of coal is in some areas of these soils. Reclaiming these soils after surface mining is fairly easy except where minesites are on steep areas near large streams. Reclamation is limited by the steep slopes, the droughty nature of rock spoil, and the wide variation of reaction. Applying topsoil will help minimize these problems. Most of the needed topsoil can be obtained onsite before mining. Montevallo soils are a poor source of topsoil because they are shallow and have steep slopes. A much thicker layer of topsoil can be obtained from some minor soils, primarily Nauvoo, Allen, and Holston soils. The loamy subsoil of these soils can be modified for suitable rooting medium by applying lime and fertilizer and minimizing tillage.

The Nauvoo soils are in capability subclass IVe and in woodland ordination group 2o. The Montevallo soils are in capability subclass VIIe and in woodland ordination group 4d.

35—Palmerdale complex, steep. This complex consists of steep, somewhat excessively drained Palmerdale soils and other soils on surface mining spoil piles. The sediment-producing slope and highwalls have convex slopes. The sediment-receiving benches, drainageways, and basins have concave slopes (fig. 10). Slope ranges from 15 to 60 percent in most areas. Areas

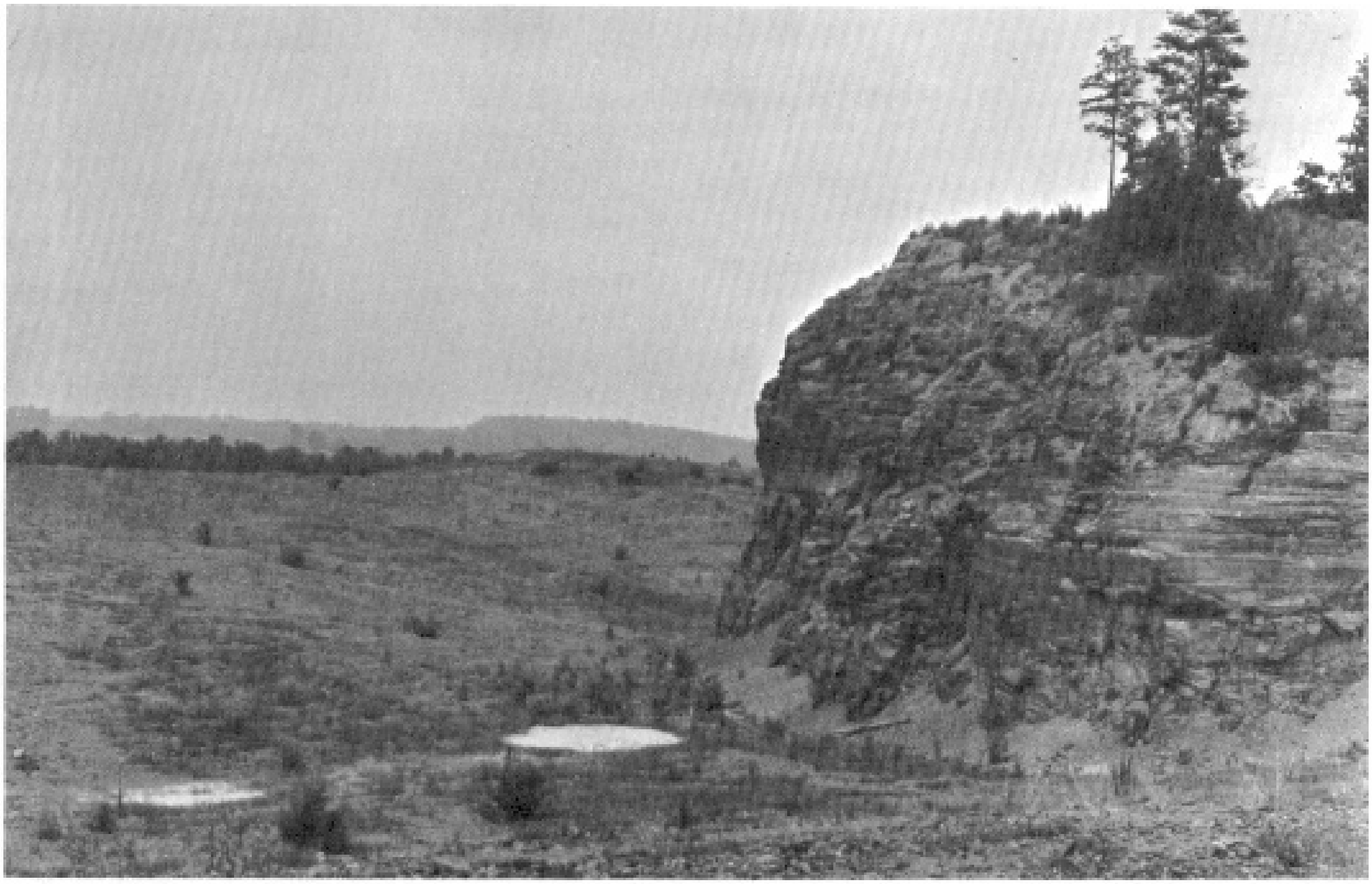


Figure 10.—In an area of Palmerdale complex, steep, the landscape is one of an eroding highwall, sloughed rock piles at the highwall base, basins, and a smoother rock spoil.

are 40 to 1,000 or more acres and irregular in shape. The areas of Palmerdale soils and other soils in this complex are so intricately mixed, or so small, that mapping them separately was not practical.

Palmerdale soils and similar soils make up about 70 percent of the map unit. Typically, Palmerdale soils are more than 60 inches thick. The soil is dark gray very shaly silt loam. In places, soils are similar to Palmerdale soils except that they are medium acid to moderately alkaline, or they have slopes of less than 15 percent.

Other soils on benches, in drainageways, and in basins make up about 20 percent of the map unit. These soils are more than 60 inches thick. Typically, they have a silt loam surface layer about 10 inches thick. The underlying material is very shaly silt loam.

The available water capacity for Palmerdale soils is low. There are lengthy periods in which soil moisture is not adequate for optimum plant growth. Palmerdale soils are moderately rapidly permeable and have a low shrink-swell potential. These soils are subject to subsidence. Surface runoff is very rapid. The hazard of rill and channel erosion is very severe. The surface layer is strongly acid to very strongly acid in Palmerdale soils and medium acid to moderately alkaline in soils similar to Palmerdale soils.

Included in mapping are areas of Montevallo, Nauvoo, and Townley soils. The included soils and areas of escarpments, highwalls, and bedrock outcrop make up about 10 percent of the map unit.

The soils are not suited to cultivated crops, pasture, and hay because of steep slopes, fragments on the surface, and the droughty nature of the soils.

Present land use of these soils is oriented primarily towards reclamation and establishment of trees (fig. 11).

Reclaiming Palmerdale soils is difficult because of steep slopes, the hazard of erosion, droughtiness, and the acidity of the soil. In addition, north facing slopes are subject to soil freezing to a depth of several inches and "frost heave" during thawing. Some of the problems of reclamation can be minimized by applying topsoil from other soils and adding lime and fertilizer. The information in table 12 should be used to locate sources of topsoil.

Palmerdale soils are suited to coniferous and deciduous trees; the potential productivity is moderate. Coniferous trees are generally favorable trees to establish on these soils. Management concerns include a severe erosion hazard, a severe equipment use limitation, and a severe seedling mortality rate. Some areas are not accessible because of slope gradients and the location of highwalls. Other soils on benches and toe slopes and in basins and drainageways have a higher potential productivity than Palmerdale soils. The alkaline soils are poorly suited to most trees, especially pines.

The soils of this map unit are in capability subclass VIIs and in woodland ordination group 3x.

36—Pits. This miscellaneous area consists of small areas that have been excavated for limestone, sandstone, shale clay, or chert. Most areas are 10 to 100 feet deep and partly to completely surrounded by vertical walls. Some areas are partly filled with water during winter and spring. Areas are 20 to 100 acres and circular in shape.

Included are small areas of unaltered and slightly altered soils. These soils generally make up less than 15 percent of the map unit.

This map unit is not assigned to either a capability subclass or a woodland ordination group.

37—Sullivan-Ketona complex, 0 to 2 percent slopes. This complex consists of nearly level, well drained Sullivan soils and poorly drained Ketona soils on flood plains and adjacent flat areas along major streams and on upland depressional areas in broad drainageways. The drainage basins in which these soils are located are dominated by limestone and chert. Areas are 40 acres or more and long and narrow in shape. The areas of Sullivan and Ketona soils are so intricately mixed, or so small, that mapping them separately was not practical.

Sullivan soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of the Sullivan soils is dark reddish brown silt loam about 5 inches thick. The subsoil is about 55 inches thick. The upper 15 inches is reddish brown silt loam, the next 5 inches is dark yellowish brown silt loam, the next 17 inches is yellowish brown silty clay loam that has strong brown mottles, and the lower 18 inches is silty clay loam mottled in shades of brown, yellow, and gray. Soils similar to Sullivan soils are cherty and moderately well

Figure 11.—Young stand of direct-seeded longleaf pine on a smoothed area of Palmerdale complex, steep.

drained. These soils are on narrow areas adjacent to hilly or steep areas of Bodine and Fullerton soils.

Ketona soils make up about 25 percent of the map unit. Typically, the surface layer of the Ketona soils is very dark grayish brown silty clay loam about 6 inches thick. The subsoil, about 44 inches thick, is gray silty clay that has light olive brown and yellowish brown mottles. The underlying material is limestone bedrock.

The available water capacity is moderate for Sullivan and Ketona soils. Soil moisture is adequate for optimum plant growth throughout the growing season. Surface runoff is slow.

Sullivan soils are moderately permeable and have a low shrink-swell potential. A high water table is between 4 and 6 feet during winter and early spring. These soils are subject to frequent brief flooding from stream overflow. The surface layer is strongly acid to neutral. It can be tilled within a wide range in moisture content. Sullivan soils are subject to sheet erosion and deposition by the movement of floodwater.

Ketona soils are slowly permeable and have a high shrink-swell potential. A high water table is at or near the surface during winter and early in spring. These soils are subject to frequent or brief flooding from stream overflow, or ponding of surface runoff. The surface layer is slightly acid to moderately alkaline. These soils can be tilled within a narrow range in moisture content.

Included in mapping are small areas of Decatur, Etowah, Fullerton, and Tupelo soils. Also included are small areas of soils that have been covered with 1 to 4 feet of fill material to reduce the hazard of flooding. Use and management of the included soils are different from Sullivan or Ketona soils. The included soils make up about 25 percent of the map unit.

The soils of this map unit are used primarily for pasture and hay crops and for woodland. A few areas are used for cultivated crops. Some areas are in small industrial, commercial, and residential uses.

These soils are well suited to cultivated crops. However, use of these soils is limited by the seasonal high water table and hazard of flooding. Surface drainage helps remove ponded water and runoff that comes from surrounding uplands. Some areas need subsurface drainage to lower the seasonal high water table. The slow permeability of the Ketona soils makes subsurface drainage impractical although drainage is needed. Crops grown on these soils should be tolerant of flooding and, if grown on Ketona soils, tolerant of wetness. Seedbeds can be prepared by minimum tillage on Sullivan soils, but additional tillage helps to break up the soil aggregates on Ketona soils.

These soils are well suited to pasture and hay crops. Deferring fertilizing and grazing during wet periods helps prevent soil compaction.

Coniferous and deciduous trees are suited to these soils. The potential productivity is moderately high to high. Wetness limits management of woodland. If trees are harvested during dry seasons, heavy equipment is less damaging to these soils.

These soils are not favorable for residential and industrial uses because of the seasonal high water table and hazard of flooding. Also, slow permeability of Ketona soils is a limitation. These limitations are difficult to overcome. Earth fill is generally necessary to help control flooding of these soils.

Some areas of these soils can be used for several kinds of recreation, mainly parks, playgrounds, golf courses, and horse farms. Location of individual facilities should be related to the degree of flooding for the site. In some flat areas of Ketona soils, surface drainage is needed.

Ketona soils are deep and contain sufficient clay for pond construction. However, they are underlain by limestone, and solution channels in the rock may increase the risk of seepage. The watershed should be carefully evaluated for potential sediment deposits, floating debris, and water quality if the pond is to be constructed downstream from urban areas.

The soils of this map unit are in capability subclass IIw. The Sullivan soils are in woodland ordination group 2w, and the Ketona soils are in woodland ordination group 3w.

38—Sullivan-Ketona-Urban land complex, 0 to 2 percent slopes. This complex consists of nearly level, well drained Sullivan soils, poorly drained Ketona soils, and areas of Urban land on flood plains and adjacent flat areas along major streams and in broad drainageways and upland depressional areas. The drainage basins, in which these soils are located, are dominated by limestone and chert. Areas are 40 acres or more and long and narrow in shape. The areas of Sullivan and Ketona soils and areas of Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Sullivan soils make up about 40 percent of the map unit. Typically, the surface layer of the Sullivan soils is dark reddish brown silt loam about 5 inches thick. The subsoil is about 55 inches thick. The upper 15 inches is reddish brown silt loam; the next 5 inches is dark yellowish brown silt loam; the next 17 inches is yellowish brown silty clay loam that has strong brown mottles; and the lower 18 inches is silty clay loam mottled in shades of brown, yellow, and gray.

Ketona soils make up about 20 percent of the map unit. Typically, the surface layer of Ketona soils is very dark grayish brown silty clay loam about 6 inches thick. The subsoil is gray silty clay that has light olive brown and yellowish brown mottles about 44 inches thick. The underlying material is limestone bedrock.

The Urban land part of this complex makes up about 20 percent of the map unit. Areas are covered by buildings, parking areas, and streets. Most Urban land areas have been filled to reduce the hazard of flooding.

The available water capacity is moderate for Sullivan and Ketona soils. Soil moisture is adequate for optimum plant growth throughout the growing season. Surface runoff is slow.

Sullivan soils are moderately permeable and have a low shrink-swell potential. A seasonal high water table is at 4 to 6 feet during winter and early in spring. The soil is subject to frequent, brief flooding. The surface layer is strongly acid to neutral. Sullivan soils are subject to erosion and deposition because of the movement of floodwaters.

Ketona soils are slowly permeable and have a high shrink-swell potential. A seasonal high water table is at or near the surface during winter and early in spring. The soil is subject to frequent, brief flooding from stream overflow or ponding of surface runoff. The surface layer is slightly acid to moderately alkaline.

Included in mapping are small areas of Decatur, Etowah, Fullerton, and Tupelo soils. The included soils make up about 20 percent of the map unit.

Most of the acreage of this map unit is in commercial and industrial uses. Other areas are idle or wooded.

The soils of this map unit are generally not favorable for residential and for commercial uses because of the seasonal high water table and the hazard of flooding. They are slowly permeable. Ketona soils have a high shrink-swell potential. To control flooding and wetness in most Urban land areas, earthfill material has been added. However, in many areas, the fill is not deep enough to eliminate these hazards. Wetness, flooding, and the slow permeability of the subsoil are severe limitations for use of the Ketona soils as septic tank absorption fields.

These soils can be used for recreation. However, location of facilities should be related to the amount of flooding for the site and the deposition from possible debris. Surface drainage is needed for some areas of Ketona soils.

Ketona soils are deep enough and have sufficient clay to be suitable for sewage lagoons if the embankments are built high enough to prevent floodwater entry. However, these soils are underlain by limestone, and excavation may expose solution channels in the rock and cause seepage.

This map unit is not assigned to a capability subclass or to a woodland ordination group.

39—Sullivan-State complex, 0 to 2 percent slopes. This complex consists of nearly level, well drained Sullivan soils on flood plains and well drained State soils on stream terraces. The drainage basins on which these soils are located are dominated by sandstone and shale. Areas are 40 or more acres and long and narrow. The areas of Sullivan and State soils are so intricately mixed, or so small, that mapping them separately was not practical.

Sullivan soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of Sullivan soils is dark brown silt loam about 4 inches thick. The subsoil is about 35 inches thick. The upper 16 inches is dark yellowish brown silt loam, and the lower 19 inches is very dark grayish brown loam. The underlying material is dark brown sandy loam to a depth of more than 60 inches. In places, soils are similar to Sullivan soils except that they have a sandy loam or loamy sand texture in all layers.

State soils make up about 25 percent of the map unit. Typically, the surface layer of State soils is dark brown silt loam about 4 inches thick. The subsurface layer is yellowish brown silt loam about 5 inches thick. The subsoil is about 31 inches thick. It is yellowish brown clay loam that has very pale brown mottles in the lower part. The underlying material is mottled sandy loam to a depth of more than 60 inches.

The available water capacity of these soils is moderate to high. Soil moisture is adequate for optimum plant growth throughout the growing season. Both soils are moderately permeable and have a low shrink-swell potential. Surface runoff is slow. These soils are subject to frequent, brief flooding. The soils are subject to erosion and deposition of sediment from floodwaters. A seasonal high water table is at 4 to 6 feet during winter and early in spring. The surface layer of both soils is very strongly acid to neutral. The soils can be tilled over a wide range in moisture content.

Included with these soils in mapping are areas of soils similar to Sullivan soils except that they are more poorly drained and are in narrow drainageways and depressions adjacent to uplands. Also included are small areas of Docena and Holston soils on stream terraces and toe slopes. The included soils make up about 25 percent of the map unit. Docena and Holston soils are contrasting soils, and use and management are different from Sullivan or State soils. These contrasting soils make up about 10 percent of most areas.

The soils of this map unit are used primarily for pasture and hay and for woodland (fig. 12). Some areas are cultivated. A few areas are used for industrial, commercial, and residential facilities.

These soils are well suited to cultivated crops. However, flooding is a hazard. Diversions help to reduce erosion. Crops grown on these soils should be tolerant of floodwaters. Seedbeds can be prepared by minimum tillage.

These soils are well suited to pasture and hay. Flooding is a management concern. Deferred grazing during wet periods will help prevent soil compaction by livestock and sod damage.

Coniferous and deciduous trees are well suited to these soils. The potential productivity is high. Flooding is a management concern. If trees are harvested during dry periods, heavy equipment is less damaging to these soils. Access is poor to some areas of these soils that are surrounded by steep soils.

Figure 12.—Sullivan-State complex, 0 to 2 percent slopes, is well suited to cultivated crops, hay and pasture, and woodland.

These soils are not favorable for residential and industrial uses because of the seasonal high water table and the flooding hazard. These limitations are difficult to overcome. Earthfill is necessary to control flooding on these soils.

Some areas of these soils can be used for several kinds of recreation, mainly parks, playgrounds, golf courses, and horse farms. Fill is needed for certain facilities. Location of individual facilities should be related to the degree of flooding for the site. Consideration should also be given to deposits of sediment and debris from floodwaters.

The soils that are suitable for pond construction are commonly surrounded by steep soils which are poor sources of soil material for construction. The watershed should be carefully evaluated for potential sediment deposits, floating debris, and water quality if the pond is to be constructed downstream from urban areas.

The soils of this map unit are in capability subclass IIw. The Sullivan soils are in woodland ordination group 2w, and the State soils are in woodland ordination group 2o.

40—Townley-Nauvoo complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained Townley and Nauvoo soils on ridges and knolls (fig. 13). Slopes are convex. Areas are 20 to 100 acres or more and irregular in shape. The areas of Townley and Nauvoo soils in this complex are so intricately mixed, or so small, that mapping them separately was not practical.

Townley soils and similar soils make up about 50 percent of the map unit. Typically, the surface layer of Townley soils is very dark grayish brown silt loam about 4 inches thick. The subsoil is about 21 inches thick. The upper 3 inches is yellowish brown silt loam, and the lower 18 inches is yellowish red silty clay. The underlying material is consolidated, weathered shale at about 25 inches. In places, soils are similar to Townley soils except that they have a clay loam subsoil or are 40 to 60 inches deep to consolidated shale; some small areas have slopes of less than 8 percent or more than 15 percent.

Nauvoo soils and similar soils make up about 20 percent of the map unit. Typically, the surface layer of Nauvoo soils is very dark grayish brown fine sandy loam about 5 inches thick. The subsoil is about 36 inches thick. The upper 4 inches is yellowish brown fine sandy loam, the next 16 inches is yellowish red clay loam, and the lower 16 inches is red clay loam that has strong

brown mottles. The underlying material is weathered sandstone at about 41 inches. In some places, soils are similar to Nauvoo soils except that they have a clay subsoil and are moderately slowly permeable.

The available water capacity is low for Townley soils and moderate for Nauvoo soils. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. Townley soils are slowly permeable and have a moderate shrink-swell potential. Nauvoo soils are moderately permeable and have a low shrink-swell potential. Surface runoff is moderately rapid. If these soils are cultivated, sheet and rill erosion is a severe hazard. Unless limed, the surface layer of either soil is strongly to very strongly acid. Townley soils can be tilled within a medium range in moisture content. Nauvoo soils can be tilled within a wide range in moisture content.

Included in mapping are areas of Albertville, Docena, Holston, Montevallo, and Sullivan soils. The included soils make up about 30 percent of most areas. Docena, Montevallo, and Sullivan soils are contrasting soils, and use and management are different from Townley or Nauvoo soils. These contrasting soils make up about 10 percent of the map unit.

The soils of this map unit are used primarily for woodland. Some areas are used for pasture and hay, and small areas are used for cultivated crops.

These soils are suited to cultivated crops. Use of these soils for crops is limited by the strong slope and hazard of erosion. Plant cover is needed at least three-fourths of the time. Terracing, contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Seedbeds can be prepared by minimum tillage. Additional tillage on Townley soils and eroded areas help to breakup soil aggregates. Irrigation on Townley soils is affected by slow permeability.

The soils of this map unit are well suited to pasture and hay. There are no significant management concerns.

Coniferous trees are well suited to these soils. The potential productivity is moderate for Townley soils and high for Nauvoo soils. There are no significant management concerns.

These soils have several unfavorable properties for residential uses. Low strength is a severe limitation for use of the Townley soils and a moderate limitation for use of the Nauvoo soils for local roads and streets. Depth to rock and subsoil permeability are severe limitations for use of the Townley soils and moderate limitations for use of the Nauvoo soils for septic tank absorption fields. The moderate shrink-swell potential of the Townley soils is a moderate limitation for building

Figure 13.—Landscape of Townley-Nauvoo complex, 8 to 15 percent slopes, is well suited to hay and pasture and woodland.

sites. In most areas, grading, cutting and filling, and excavating are needed for local roads and streets and dwelling sites. Grading can be minimized by laying out the primary streets along the ridgetops and lateral streets extending toward drainageways. In areas to be filled, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

The soils of this map unit are suited to most recreation uses. In most areas, grading is needed for preparing a site for intense recreation uses. Before grading, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

Numerous sites for ponds exist in this complex. Townley soils are clayey and slowly permeable and have good basins for reservoirs. To minimize the risk of seepage, construction soil material should not be removed from the reservoir floor. Layers of permeable weathered sandstone exposed should be sealed off with clay.

The soils of this map unit are in capability subclass VIe. The Townley soils are in woodland ordination group 4o, and the Nauvoo soils are in woodland ordination group 2o.

41—Townley-Urban land complex, 8 to 15 percent slopes. This complex consists of strongly sloping, well drained Townley soils and areas of Urban land on shale ridges and knolls. Areas are 40 acres or more and irregular in shape. The areas of Townley soils and Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Townley soils and similar soils make up about 40 percent of the map unit. Typically, the surface layer is very dark grayish brown silt loam about 4 inches thick. The subsoil is about 21 inches thick. The upper 3 inches is yellowish brown silt loam, and the lower 18 inches is yellowish red silty clay. The underlying material is consolidated, weathered shale. Many areas have been altered either by grading or by spreading excavated subsoil over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. Areas are covered by houses, streets, driveways, and parking areas.

The available water capacity of Townley soils is low. In most years, there are periods in which soil moisture is not adequate for optimum plant growth. Townley soils are slowly permeable and have a moderate shrink-swell potential. Surface runoff is moderately rapid. If Townley soils do not have a plant cover, sheet and rill erosion is a severe hazard. The surface layer is strongly to very strongly acid.

Included in mapping are small areas of Albertville, Docena, Montevallo, Nauvoo, and Sullivan soils. The inclusions make up about 30 percent of the map unit. Montevallo, Docena, Nauvoo, and Sullivan soils are contrasting soils, and use and management are different from Townley soils. These contrasting soils make up about 20 percent of most areas.

The soils of this complex are used primarily for residential structures. Other areas are wooded or idle.

Townley soils have several unfavorable properties for residential uses. In most areas, grading, cutting and filling, and excavating are needed for local roads and streets and for dwelling sites. Low strength is a severe limitation for use of these soils for local roads and streets. Depth to rock and the slowly permeable subsoil are severe limitations to use of these soils for septic tank absorption fields. The moderate shrink-swell potential is a limitation for building sites. Plants are difficult to maintain if the surface layer has been removed or if excavated subsoil has been spread over the surface layer. Plants on these areas generally need frequent watering. On areas where the surface layer was stockpiled and respread, plants are easy to maintain, and minimal watering is needed.

The soils of this map unit are suited to most recreation uses. In most areas, grading of the soil is needed for sites for intensive recreational uses. Before grading, the surface layer should be removed, stockpiled, and respread to provide a good rooting medium for plants.

The soils of this map unit are not assigned to a capability subclass or to a woodland ordination group.

42—Tupelo silt loam, 0 to 4 percent slopes. This nearly level to gently sloping, moderately well drained soil is on uplands of limestone valleys. Slopes are convex. Drainageways are broad, poorly defined, and concave. Some areas have small sinkholes. Areas are 100 acres or more and long and broad in shape.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is mottled in shades of yellow, gray, and brown and is about 47 inches thick. The upper 6 inches is silty clay loam, and the lower 41 inches is clay. The underlying material is limestone bedrock. In places, soils are similar to Tupelo soil except that they either have red subsoil or have a yellow subsoil without gray mottles.

The available water capacity of this soil is moderate. Soil moisture is adequate for optimum plant growth throughout the growing season. Permeability is slow, and the shrink-swell potential is high. Surface runoff is slow. A seasonal high water table is at 1 foot to 2 feet below the surface during winter and spring. If this soil is cultivated, sheet and rill erosion is a slight hazard. Unless limed, the surface layer is medium to strongly acid. This soil can be tilled within a narrow range in moisture content.

Included with this soil in mapping are small areas of Barfield soils and Rock outcrop on uplands, Ketona soils in depressional areas, Sullivan soils in drainageways, and Etowah soils on colluvial fans and toe slopes. The included soils generally make up about 15 percent of most areas.

The soil is used primarily for pasture and hay and woodland. Some areas are in residential, industrial, or commercial uses.

This soil is suited to cultivated crops. Wetness and slow permeability are the main limitations. Plant cover is needed half of the time. Contour stripcropping, contour farming, using cover crops, using minimum tillage, returning crop residue to the soil, and establishing grassed waterways help to control erosion. Some areas need terraces, but they are difficult to construct because of the undulating topography. Many areas need surface drainage to remove surface water. In places, tillage is limited by limestone bedrock outcrop. Seedbeds are difficult to prepare because of the large soil aggregates. The soil can be tilled within a narrow range of moisture content. This soil is somewhat difficult to irrigate because of slow infiltration.

This soil is well suited to pasture and hay. Soil compaction and sod damage are management concerns. These can be reduced by not cutting forage and by deferring grazing during wet seasons.

Coniferous trees are suited to this soil. The potential productivity is moderate. If trees are harvested during dry periods, heavy equipment is less damaging to the soil.

This soil has unfavorable properties for residential and commercial uses. Wetness, the depth to rock, shrink-swell potential, low strength, and slow permeability of this soil are the main limitations. Low strength and the high shrink-swell potential are severe limitations for local roads and streets. Wetness and the high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Blasting of bedrock is generally necessary to install sewers and other structures at depth of more than 3 feet. Onsite investigation is needed to evaluate sinkholes that may form in cavernous limestone below the soil. This soil is poorly suited to septic tank absorption fields because of slow permeability and a seasonal high water table.

This soil is suited to some recreation uses. In some areas, grading is needed for preparing sites for intensive recreation uses. Wetness is a severe limitation, and surface drainage is needed for most recreation uses.

Many sites for pond construction exist. The only significant management concern is the depth to rock.

This Tupelo soil is in capability subclass IIw and in woodland ordination group 3w.

43—Tupelo-Urban land complex, 0 to 4 percent slopes. This complex consists of nearly level to gently sloping, moderately well drained Tupelo soils and areas of Urban land on sides of limestone valleys. Some areas have sinkholes. Areas are 100 acres or more and long and broad in shape. The areas of Tupelo soils and areas of Urban land are so intricately mixed, or so small, that mapping them separately was not practical.

Tupelo soils and similar soils make up about 55 percent of the map unit. Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is mottled in shades of yellow, gray, and brown and is about 47 inches thick. The upper 6 inches is silty clay loam, and the lower 41 inches is clay. The underlying material is limestone bedrock at a depth of about 55 inches. Many areas have been altered either by grading or by spreading excavated subsoil over the surface layer.

The Urban land part of this complex makes up about 30 percent of the map unit. Areas are covered by buildings, streets, and parking areas.

The available water capacity of Tupelo soils is moderate. Soil moisture is generally adequate for optimum plant growth throughout the growing season. Tupelo soils are slowly permeable and have a high shrink-swell potential. Surface runoff is slow. A seasonal high water table is at 1 foot to 2 feet below the surface during winter and spring. If these soils do not have a plant cover, sheet and rill erosion is a slight hazard. Unless limed, the surface layer is medium to strongly acid.

The soils of this complex are used primarily for industrial, commercial, and residential structures. Other areas are idle.

These soils have unfavorable properties for residential, commercial, and industrial uses. Wetness, the depth to rock, the high shrink-swell potential, low strength, and the low permeability of the subsoil are the main limitations. Low strength and the high shrink-swell potential are severe limitations for local roads and streets; those which are constructed on the subsoil generally incur damage. Wetness and the high shrink-swell potential are severe limitations for dwellings and small commercial buildings. Cracked walls and foundations are common in structures on these soils. Blasting of bedrock is generally necessary to install sewers and other structures at depths of more than 3 feet. Onsite investigation is needed to evaluate sinkholes that may form in cavernous limestone below the soil. Wetness and the slow permeability of the subsoil are severe limitations for the use of these soils for septic tank absorption fields, and failure is common.

Tupelo soils are suited to some recreation uses. In some areas, grading is needed for preparing sites for intensive recreation. Wetness is a severe limitation, and surface drainage is needed.

The soils of this map unit are not assigned to either a capability subclass or a woodland ordination group.

44—Urban land. This mapping unit consists of areas covered by commercial, industrial, and high density residential facilities. These areas have been altered to achieve large areas that are nearly level, to avoid flooding or wetness problems, or to increase the load supporting capacity. The original soil was altered by cutting and filling, shaping and grading, excavating, blasting, compacting, or covering with concrete or asphalt. These areas are not differentiated by original

soil or by underlying rock or sediments. Areas of this map unit are generally larger than 160 acres.

Included in mapping are small areas of soils that have not been altered. These soils generally make up less than 15 percent of the map unit.

This map unit is not assigned to either a capability subclass or a woodland ordination group.

prime farmland

Prime farmland is one of several kinds of important farmlands defined by the U.S. Department of Agriculture. It is of major importance in providing the Nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the use of our Nation's prime farmland with wisdom and foresight.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce a sustained high yield of crops when treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland may now be in crops, pasture, woodland, or other land, but not urban and built-up land or water areas. It must either be used for producing food or fiber or be available for these uses.

Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It also has favorable temperature and growing season, acceptable acidity or alkalinity. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods and is not frequently flooded during the growing season. The slope ranges mainly from 0 to 6 percent. For more detailed information on the criteria for prime farmland, consult the local staff of the Soil Conservation Service.

About 23,000 acres, or 3 percent, of Jefferson County meets the soil requirements for prime farmland. Areas are scattered throughout the county, but most are in the northwestern part on a sandstone plateau near Corner.

The trend in land use in the county has been the loss of some prime farmlands to industrial and urban uses. Historically, about 6 percent of Jefferson County would probably have met the requirements for prime farmland, but about half has been lost to urbanization. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and difficult to cultivate, and usually less productive.

Soil map units that make up prime farmland in Jefferson County are listed in this section. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 5. The location is shown on the detailed soil maps in the back of this publication. The soil qualities that affect use and management are described in the section "Detailed soil map units."

The map units that meet the soil requirements for prime farmland, except where the use is urban or built-up land,[1] are:

2—Albertville silt loam, 2 to 6 percent slopes
3—Allen fine sandy loam, 2 to 6 percent slopes
10—Decatur silt loam, 2 to 8 percent slopes
15—Etowah loam, 2 to 8 percent slopes
24—Holston loam, 2 to 8 percent slopes
30—Nauvoo fine sandy loam, 2 to 8 percent slopes

The soils in several map units have limitations such as a seasonal high water table or flooding. These soils could qualify as prime farmland if these limitations are overcome by measures such as drainage or flood control; however, these soils are not included in the list.

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[1] Urban and built-up land is any contiguous unit of land 10 acres or more that is used for residences, industrial sites, commercial sites, construction sites, institutional sites, public administrative sites, railroad yards, small parks, cemeteries, airports, golf courses, and so forth.

use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of roadfill and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Robert F. Berry, conservation agronomist, Soil Conservation Service, helped prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the Jefferson County office of the Soil Conservation Service or the Cooperative Extension Service.

In 1979, about 1,000 acres of soybeans and 700 acres of corn were planted in Jefferson County (*18*). About 4,200 acres of grasses and legumes was harvested for hay in 1979. Large acreages of vegetable crops are produced on much of the cultivated land. Most of the vegetable production is on soils on a sandstone plateau in the northwestern part of the county.

The acreage of cultivated crops has been decreasing and the acreage of pastureland has been increasing (*14*). Urban use of the land continues to expand. Approximately half of the soils that would have been prime farmland are now in urban uses. This prime farmland loss is permanent.

Coal is located under about two-thirds of the land in the county; much of it may be excavated by surface mining. Current and potential agricultural land that may be surface mined would be adversely affected unless properly reclaimed for food and fiber production.

The potential of the soils in Jefferson County for increased production of food and fiber is fair. About 48,000 acres of potentially good cropland is used for pasture and woodland. Because of the large land holdings by commercial companies, much of the cropland potential is limited as the land is committed to other uses. Yields could be increased on cultivated land provided the most recent technology is applied. This soil survey will help in making land management decisions and in applying recent crop production technology.

Field crops suited to the soils and climate of Jefferson County include many that are not commonly grown. Soybeans, vegetables, corn, cotton, and wheat are usually the main row crops. Peanuts, potatoes, grain sorghum, and similar crops can be grown when economic conditions are favorable. Specialty crops grown in the county include cucumbers, tomatoes, sweet potatoes, green beans, peas, sweet corn, greens, and melons. Specialty crops are well suited to Allen and Nauvoo soils. Pecans and peaches are grown commercially in the county, however, the acreage is

small. Apples, plums, and pears are also well suited to the area. Wheat and rye are the only close-growing crops planted for grain production. However, oats and barley could be grown.

Information and suggestions for growing specialty crops can be obtained in Jefferson County from the local offices of the Cooperative Extension Service and the Soil Conservation Service.

Soil erosion is a major problem on about three-fourths of the cropland and two-thirds of the pastureland in Jefferson County. If the slope is more than 2 percent, erosion is a potential hazard. Albertville, Allen, Decatur, Etowah, Holston, and Nauvoo soils are some of the soils that are cultivated which have slopes of 2 percent or more.

Loss of soil through erosion is damaging in several ways. Productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on soils that have a clayey subsoil such as Townley soils and on soils that have bedrock below the subsoil which restricts rooting depth such as Gorgas soils. Soil erosion results in sediment that causes offsite damage. Control of erosion on farmland minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps plant cover and crop residue on the land for extended periods can hold soil erosion losses to amounts that will not reduce the productive capacity of the soils. On livestock farms, legume and grass forage crops can be incorporated into the cropping system to reduce erosion in sloping areas. The crops also improve tilth and provide some nitrogen for the crops that follow in the rotation.

Conservation tillage and returning crop residue to the soil help increase water infiltration and reduce the hazards of runoff and erosion. No-till production for corn and soybeans is effective in reducing erosion on sloping areas. No-till can be adapted to most soils in the county and can be used in fields that are unfavorable for terraces and contour farming.

Terraces and diversions shorten the length of slope, control runoff, and reduce erosion. They are most practical on deep, well drained sloping soils such as Albertville, Allen, Decatur, Etowah, and Holston soils. Some soils in Jefferson County are poorly suited to terracing because of irregular slopes such as those of Fullerton soils, clayey subsoil which will be exposed in the terrace channel such as in Townley and Albertville soils, shallow depth to rock such as in Gorgas and Barfield soils, or Rock outcrop such as in the Etowah-Rock outcrop complex. Diversions intercept surface runoff from hilly uplands and divert the water around fields on toe slopes at lower elevation.

Contour farming is effective in reducing erosion on cultivated cropland. It is best suited to soils that have smooth, uniform slopes.

Information on the design of erosion control structures is available at the local office of the Soil Conservation Service.

Jefferson County has an adequate amount of rainfall for crops commonly grown; however, the distribution of rainfall during spring and summer is usually such that drought periods occur during the growing season in most years. Irrigation is needed on most soils to prevent drought stress in most years. The majority of soils commonly used for cultivated crops are suited to irrigation. However, some soils such as Townley and Tupelo soils have a slow infiltration rate that limits irrigation, and wet soils such as Docena soils rarely need irrigation.

Seedbed preparation and cultivation are difficult in eroded clayey areas because the original friable surface layer has been removed. Additional tillage may be needed to disrupt soil aggregates. Such conditions are common in Townley and Albertville soils.

Most of the soils that are used for crops in Jefferson County have a fine sandy loam, loam, or silt loam surface layer that is light in color and low in organic matter content. Soils that have a high silt content and have a weak structure in the surface layer are subject to crusting after an intense rainfall. The crust is hard when dry and is almost impervious to water. It reduces infiltration of water and increases runoff. Regular additions of crop residue, manure, and other organic material can help improve soil structure and reduce crust formation.

The use of large tractors and heavy equipment results in a compact layer in some soils. Such a layer is normally 2 to 12 inches below the soil surface. It is called a traffic pan, and it restricts infiltration of water and growth of plant roots. Soils that are likely to develop a traffic pan include Allen, Holston, and Nauvoo soils.

Soil tilth is an important factor in seed germination, and it affects the infiltration of water into the soil. Soils that have good tilth have a granular and porous surface layer. Tilth is affected by farming methods and the degree of erosion.

Soil fertility is naturally low in most of the soils in Jefferson County. Soils on flood plains and terraces, such as State and Sullivan soils, are higher in natural fertility than most upland soils. All soils in the county, except Ketona soils, need ground limestone to neutralize soil acidity. Crops on all soils in the county respond well to fertilizer. Available phosphorus and potash levels are usually low in most of the soils. However, some fields have a buildup of phosphorus or potassium from applications of high rates of commercial fertilizer in the past. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of crops, and on the expected level of yields. The

Cooperative Extension Service can help in determining the kind and amount of fertilizer and lime to apply.

Soil wetness is a problem on several soils such as Docena and Tupelo soils. Some soils are naturally too wet for crop and pasture plants that are commonly grown in Jefferson County. For other soils, drainage would increase crop and pasture production. In either case, drainage can reduce soil wetness. Surface drainage removes water that accumulates on the soil. Subsurface drainage lowers the water table.

Many areas of well drained or moderately well drained soils have seep areas near drainageways. The soils immediately adjacent to the drainageways are wet in the spring; farming operations are often delayed. Subsurface drainage removes excess water from the wet areas. Underground drainage systems can be used to intercept seepage water on toe slopes and divert it from the lower lying cropland.

The design of both surface and subsurface drainage systems depends on the properties of the soil. A combination of surface drainage and tile drainage is needed on some soils. The drainage tile lines will need to be more closely spaced in soils that are slowly permeable than in those that are more permeable.

Pasture and hay crops are important in the county. Tall fescue, bahiagrass, common bermudagrass, hybrid bermudagrasses, and dallisgrass are the main perennial grasses grown for pasture and hay. Wheat, ryegrass, and rye are grown for annual cool season forage and millet, sorghum, and hybrid forage sorghum provide most of the annual warm season forage. These annuals are normally grown on cropland for temporary grazing. Arrowleaf clover, white clover, crimson clover, ball clover, and other cool season forage legumes will grow on several soils in the county, especially if agricultural limestone is applied. The warm season forage legumes such as sericea and annual lespedeza are well adapted to most soils used for pasture.

For pasture and hay production, proper grazing or cutting heights, control of weeds, proper fertilization, rotational grazing, and scattering animal droppings are needed. Soils such as Docena soils are suited to summer grazing because of the wetness during the winter and early in spring. Cool season perennial grasses, such as tall fescue, should not be grazed in summer so that food reserves will be stored in the plants for growth in the fall. Overgrazing and low fertilization are the two main problems associated with pasture production. Both result in weak plants and poor stands that are quickly infested with weeds. To prevent weeds from becoming established, maintain a dense ground cover of desirable pasture plants.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, animal manure, and green-manure crops; and harvesting that insures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

landscaping and gardening

Robert F. Berry, conservation agronomist, Soil Conservation Service, helped prepare this section.

The primary uses of the land in residential areas are house sites and related driveways and streets. The remaining area of each lot is commonly used for vegetative cover to prevent erosion and enhance the appearance of the home; gardens for vegetables or flowers and shrubs; orchards for fruits and nuts; recreation; habitat for animals and birds; shade to conserve energy use; vegetation and structures for the abatement of undesirable noise, visual areas, and winds; and for septic tank absorption fields. Because residents use the outdoor area for several purposes, careful planning and a good understanding of the soil is needed for land use around the home.

This section contains general soil related information for landscaping and gardening around the homesite. Other information, especially that which is not directly soil related, may be obtained from the Extension Service, Soil Conservation Service, and private lawn, garden, nursery, fertilizer, and seed businesses. The amount of soil information needed for some areas is too detailed and is beyond the scope and map scale of this survey. For this reason, onsite soil investigations are recommended in addition to use of information available in this survey and elsewhere.

Most of the soils in the residential areas of Jefferson County have been disturbed to some degree during construction of houses, streets, driveways, and utility service. These involved cutting and filling, grading, excavating, and blasting. As a result, soil properties are more variable and less predictable than they are naturally. Onsite examination is necessary in planning land use for disturbed soils.

Some of the poorest media for plant growth are soils of the Albertville and Townley series that have had the surface layer removed during grading. This exposed the dense, firm subsoil that restricts root penetration, absorbs little rainfall, and causes excessive runoff. These conditions are common where these and similar soils are mapped as complexes with Urban land. The incorporation of organic matter into the soil improves tilth and infiltration and makes a more desirable rooting medium. Areas that are subject to intensive foot traffic should be covered with a mulch such as pine bark, wood chips, gravel, or similar material for protection.

Some soils such as Docena, Ketona, and Tupelo are "wet soils". The wetness associated with these soils limits the kinds of plants to those tolerant of high moisture in the soil. There are several methods of minimizing the effect of soil wetness. To lower the water table, install underground tile drains in permeable soils. Bedding the surface layer of slowly permeable soils, such as Ketona and Tupelo, helps develop a satisfactory rooting zone for some plants.

Some soils such as Ketona, Sullivan, and State are located on flood plains. On these soils most plants used for gardening and landscaping can be grown on these soils; however, consideration should be given to the effect of floodwater on these plants. Drainage is a concern because urban use—houses, buildings, streets—results in surface runoff that increases the frequency and amount of flooding in urban watersheds. Advise and assistance in solving drainage problems can be obtained from the Soil Conservation Service, municipal and county engineering departments, and private engineering companies.

Shallow depth to bedrock and rock fragments in the soil affect the kinds of plants that can be grown. Cut and fill activities sometimes expose bedrock and reduce the rooting zone of plants. Barfield, Gorgas, and Montevallo soils are naturally shallow to bedrock, and removal of any soil material decreases the depth of the root zone.

Some soils, such as Birmingham, Bodine, and Fullerton soils have many fragments of rock, and the amount of fragments is greater in the lower part of the soil. Root growth is adversely affected, and available water capacity is reduced as the amount of rock increases. Many disturbed areas have broken concrete, brick, and other debris buried under soil material. In these areas, the soil is usually too thin or of quality too

poor to support much plant growth. In most cases, such as those described above, topsoil applications are needed to provide an adequate rooting medium for plants, especially those areas used in landscaping and gardening.

Natural fertility is low in most of the soils in Jefferson County. Most of the soils are strongly to very strongly acid. The addition of ground limestone to neutralize soil acidity and the addition of fertilizer to furnish plant nutrients is necessary for most soils. The surface layer contains the most plant nutrients and most favorable pH for the majority of plants. In many areas, fertility of the surface layer has been increased by applying lime and fertilizer. If the surface layer is removed during construction, the remaining soil is very acid and is extremely low in plant nutrients. Also, many nutrients are unavailable for plant growth in acid soil conditions. Disturbed soils generally need much larger amounts of lime and fertilizer. Lime and fertilizer should be applied according to soil test recommendations and the type of plants grown. Information on sampling for soil testing can be obtained from the Extension Service, Soil Conservation Service, and many fertilizer businesses.

In the following paragraphs, some of the plants that are used in landscaping and gardening are briefly discussed. Some management relationships between these plants and the soil are included. Information in this section should be supplemented by consulting with specialists in the Extension Service, Soil Conservation Service, and in private landscaping and gardening businesses.

Grasses commonly used for landscaping in Jefferson County are mainly vegetatively propagated species such as zoysiagrass, hybrid bermudagrass, centipedegrass, and seeded species such as the fescues, common bermudagrass, bluegrass, and centipedegrass. Grasses commonly used for short-term cover include ryegrass, rye, wheat, sudangrass, and millet.

The vegetatively propogated plants are usually planted as sprigs, plugs, or solid sodding. Topsoil applications may be needed before planting. Also, lime and fertilizer should be applied and incorporated into the soil. The plants should be placed in close contact with the soil. Water the plantings to insure that the root system becomes well established in the soil. Centipedegrass and the strains of zoysiagrass have moderate shade tolerance. However, zoysiagrass normally requires more maintenance. The strains of hybrid bermudagrass are fast growing, but they do not have the shade tolerance of centipedegrass and zoysiagrass.

Common perennial grasses that are established by seeding include fine leaf fescue and bluegrass for cool season lawns and common bermudagrass and centipedegrass for warm season lawns. Lime and fertilizer should be applied before seeding and incorporated into the soil. Proper planting depth is important in establishing grasses from seed.

Short-term vegetative cover is used to protect the soil at construction sites or to provide soil cover between the planting seasons of the desired grass species. The most commonly used grasses for short-term cover are ryegrass for cool seasons and sudangrass or millet for warm seasons. These are annuals which die after the growing season.

Periodically, lime and fertilizer should be applied on all types of grasses according to recommendations based on soil test results.

Vines are also important vegetative cover for moderately shaded areas and steep slopes that cannot be mowed. Ground ivy, periwinkle, and honeysuckle can be used for ground cover. These plants can also be used for areas of Rock outcrop and on walls and fences. All of these plants are propagated vegetatively, usually from potted plants or sprigs.

Mulches can be used for ground cover on areas where traffic is too heavy for grass cover, on areas where shrubs and flowers are desired with additional ground cover, and on densely shaded areas. Mulches provide effective ground cover. They also provide immediate cover for erosion control on areas where no live vegetation is desired. Effective mulches include pine straw, small grain straw, hay, composted grass clippings, wood chips, pine bark, rocks, and several manufactured materials. The type of mulch to use is somewhat dependent on the potential hazard of erosion. Mulches can also be used to conserve soil moisture and control weeds around trees, shrubs, and flowers.

Shrubs are used primarily to enhance the appearance of homesites. They can also be used to control traffic on areas that will not tolerate traffic or where traffic is not desired. Shrubs can be effective in dissipating the energy from raindrops and from runoff from roofs of houses. Most native and adapted species add variety to residential settings. Reaction to acidity and fertility levels vary greatly among shrub types.

Vegetable and flower gardens are important to many individuals and businesses. However, the areas where homes and businesses are located may not be on soils suited to vegetables and flowers. Soils that have been disturbed by construction may not be productive unless topsoil is applied. Soils that have a slope of more than 8 percent have poor potential for vegetable gardening because of the hazard of erosion if the soils are tilled. Usually, soils on steep slopes have a thin surface layer. However, flower gardening is possible on steep slopes if mulches are used to help control erosion. Gardens in which composted tree leaves and grass clippings have been incorporated into the soil generally are fertile, friable, and have good moisture content. Additional information on vegetable crops is included in the "Crops and pasture" section of this survey.

Most garden plants grow best in soils that have a pH between 5.5 and 6.5. The fertility level should be high. Many gardeners apply too much fertilizer or have used

fertilizers with the wrong combination of plant nutrients. A soil test is the only effective way to determine how much and what type of fertilizer to apply. Soil test information can be obtained from the Extension Service, Soil Conservation Service, or retail fertilizer businesses.

Trees are important in landscaping homesites. Information on soil and tree relationships can be obtained in the section "Woodland management and productivity." Special assistance in urban forestry can be obtained from the Alabama Forestry Commission.

woodland management and productivity

Jerry L. Johnson, forester, Soil Conservation Service, and Tom Kimbrell, forester, Alabama Forestry Commission, helped prepare this section.

Jefferson County has about 459,000 acres of commercial forest land. This makes up about 64 percent of the total land area of the county. Forest acreage has been decreasing primarily because of urbanization. Private landowners as well as steel and coal companies own the majority of the forest land in Jefferson County (*1, 8*).

Forest types in Jefferson County are 11,000 acres of longleaf-slash pine, 207,000 acres of loblolly-shortleaf pine, 134,000 acres of oak-pine, 95,000 acres of oak-hickory, 6,000 acres of oak-gum-cypress, and 6,000 acres of elm-ash-cottonwood. The majority of the forest in the county has a site index of 70 or less. Less than 5 percent of the forest has a site index of 90 or above (*16*). Forests in Jefferson County contain about 101,000 acres of sawtimber, 162,000 acres of poletimber, and 196,000 acres of seedlings and saplings (*8*).

Many acres on uplands now growing hardwoods are well suited to pines. Species such as oak and hickory, which are growing on upland sites, are primarily used as pulpwood, firewood, and mining timber.

Many acres of forest soils are underlain by coal and may be surface mined in the future. Many surface mined areas that have been reclaimed are planted to trees.

In Jefferson County, 88 wood production firms employ over 1,700 people (*10*). The value of forest in the county for producing wood products is substantial, though it is below its potential. Values other than wood products include grazing, wildlife, recreation, natural beauty, environmental quality, and conservation of soil and water.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep slopes. The letter *o* indicates that limitations or restrictions are insignificant. If a soil has more than one limitation, the priority is as follows: x, w, t, d, c, s, f, and r.

In table 7, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Ratings of *windthrow hazard* are based on soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. A rating of *slight* indicates that a few trees may be blown down by normal winds; *moderate*, that some trees will be blown down during periods of excessive soil wetness and strong winds; and *severe*, that many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; *severe* indicates that plant competition is expected to prevent the establishment of

a desirable stand unless the site is intensively prepared, weeded, or otherwise managed to control undesirable plants.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index.* This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

recreation

Jefferson County has a large urban population and a need for large areas of land that are dedicated to recreation. Numerous areas are of scenic, geologic, and historic interest. Many areas are used for public parks, golf courses, horse farms, and playgrounds. Steep, undeveloped land in and around urban areas is used for hiking, riding, camping, picnicking, hunting, fishing, and sightseeing. Water-based recreation areas are somewhat limited, but there are many areas for such use along the Warrior River and around several medium to large lakes.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in Jefferson County are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, bahiagrass, dallisgrass, clover, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are blackberry, goldenrod, beggarweed, pokeweed, partridge pea, and crabgrass.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, yellow-poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, persimmon, and black walnut.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, cedar, and juniper.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, cattail, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, morning dove, meadowlark, field sparrow, cottontail, and red fox.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, ruffed grouse, woodcock, thrushes, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and beaver.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of earthfill and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil

reaction, a high water table, depth to bedrock, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption and surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope and bedrock can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil has been removed, the soil remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 12 gives information about the soils as a source of roadfill and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. All soils in Jefferson County are an improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of stones or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of stones or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil

and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 19.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*3*) and the system adopted by the American Association of State Highway and Transportation Officials (*2*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GM, GC, SM, and SC; silty and clayey soils as ML, CL, MH, and CH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested, with group index numbers in parentheses, is given in table 19.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are

thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused either by overflowing streams or by runoff from adjacent slopes. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, common, occasional, and frequent. *None* means that flooding is not probable; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

physical and chemical analyses of selected soils

The results of physical analysis of several typical pedons in the survey area are given in table 17 and the results of chemical analysis in table 18. The data are for soils sampled at carefully selected sites. The pedons are typical of the series and are described in the section "Soil series and their morphology." Soil samples were analyzed by the Agronomy and Soils Mineralogy Laboratory, Auburn University, and the National Soil Survey Laboratory, Soil Conservation Service, Lincoln, Nebr.

Determinations were made on soil material smaller than 2 millimeters in diameter. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to SCS published methods (*15*), except the Hajek et al. method used for extractable bases.

Extractable bases and base saturation—determined by rapid soil-testing methods of Hajek et al. (*6*).

Sand—(0.05-2.0 mm fraction) weight percentages of materials less than 2 mm (3A1).

Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all materials less than 2 mm (3A1).

Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of materials less than 2 mm (3A1).

Reaction (pH)—1:1 water dilution (8C1a).

engineering index test data

Table 19 shows laboratory test data for several pedons sampled at carefully selected sites in the survey area. The pedons are typical of the series and are described in the section "Soil series and their morphology." The soil samples were tested by the Alabama Highway Department, Bureau of Materials and Tests, Montgomery, Ala.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) or the American Society for Testing and Materials (ASTM).

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*17*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 20, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Ultisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Udult (*Ud*, meaning humid, plus *ult*, from Ultisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Hapludults (*Hapl*, meaning minimal horizonation, plus *udult*, the suborder of the Ultisols that have an udic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Hapludults.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is clayey, mixed, thermic Typic Hapludults.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*13*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*17*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Albertville series

The Albertville series consists of deep, well drained, moderately slowly permeable soils that formed in shale residuum on uplands. Most of these soils are in the southwestern portion of Shades Valley. Slope ranges from 2 to 6 percent.

Albertville soils are geographically associated with Docena, Holston, and Townley soils. Docena soils are moderately well drained. Holston soils have a loamy B2t horizon and are deeper to bedrock. Townley soils are shallower to shale.

Typical pedon of Albertville silt loam, 2 to 6 percent slopes, in a pasture about 3 miles west of Greenwood, 2,000 feet east, and 2,800 feet south of the northwest corner of sec. 5, T. 20 S., R. 4 W.

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; friable; many fine and medium roots; slightly acid; abrupt smooth boundary.

B1—7 to 10 inches; yellowish brown (10YR 5/6) silty clay loam; weak medium subangular blocky structure; friable; many fine and medium roots; strongly acid; clear smooth boundary.

B21t—10 to 32 inches; yellowish brown (10YR 5/6) silty clay; moderate medium subangular blocky structure; firm; common fine and medium roots; common fine root pores; thin continuous clay films on faces of peds; few fine shale fragments; very strongly acid; gradual wavy boundary.

B22t—32 to 59 inches; mottled yellowish brown (10YR 5/6), yellowish red (5YR 5/6), red (2.5YR 4/6), light brownish gray (10YR 6/2), and strong brown (7.5YR 5/6) silty clay; moderate medium subangular blocky structure; firm; few fine roots; thin continuous clay films on faces of peds; light brownish gray mottles in lower part; few fine shale fragments; very strongly acid; clear wavy boundary.

Cr—59 to 72 inches; thin layers of dark reddish brown (2.5YR 3/4) highly weathered soft shale and gray (10YR 6/1) silty clay; few strong brown (7.5YR 5/8) mottles; very strongly acid.

Solum thickness and depth to shale range from 40 to 60 inches. Reaction is strongly acid to very strongly acid except where the surface layer has been limed. Fragments of small shale and sandstone range from 0 to 10 percent by volume in most horizons.

The A horizon is 4 to 7 inches thick. Texture is silt loam or loam. This horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 through 3.

If present, the B1 horizon is loam, silty clay loam, or clay loam and is 3 to 11 inches thick. This horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 4 or 6.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. Texture is clay, silty clay, silty clay loam, or clay loam. In most pedons, the lower part of the B2t horizon is mottled in shades of yellow, red, brown, and gray.

The Cr horizon is highly weathered soft shale.

Allen series

The Allen series consists of deep, well drained, moderately permeable soils that formed in loamy colluvium. These soils are on mountain foot slopes, valley sides, high stream terraces, and sandstone plateaus that are capped with old sediments. Slope ranges from 2 to 15 percent.

Allen soils are geographically associated with Bodine, Holston, Leesburg, Montevallo, and Nauvoo soils. Bodine, Leesburg, and Montevallo soils have more fragments of chert, shale, or sandstone. Holston and Leesburg soils have a yellower B2t horizon. Montevallo soils are shallow to shale. Nauvoo soils are shallower to weathered sandstone bedrock.

Typical pedon of Allen fine sandy loam, 8 to 15 percent slopes, in a wooded area about 1 mile northwest of Palmerdale, 1,700 feet west and 4,200 feet north of the southeast corner of sec. 8, T. 15 S., R. 4 W.

A1—0 to 4 inches; dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; very friable; many fine and medium roots; medium acid; clear boundary.

B1—4 to 9 inches; yellowish red (5YR 5/6) loam; moderate fine subangular blocky structure; friable; common fine and medium roots; medium acid; clear wavy boundary.

B21t—9 to 26 inches; yellowish red (5YR 4/8) sandy clay loam; moderate medium subangular blocky structure; friable; common fine roots; few fine root pores; thin discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—26 to 51 inches; yellowish red (5YR 4/8) clay loam; common medium distinct red (2.5YR 4/8), yellowish brown (10YR 5/8), and pale brown (10YR 6/3) mottles; moderate medium subangular blocky structure; friable; few fine roots and root pores; thin discontinuous films on faces of peds; strongly acid; gradual wavy boundary.

B23t—51 to 80 inches; mottled yellowish red (5YR 5/8), red (2.5YR 4/8), yellowish brown (10YR 5/8), and pale brown (10YR 6/3) clay loam; moderate medium subangular blocky structure; friable; thin discontinuous clay films on faces of peds; few sandstone fragments; strongly acid.

Solum thickness is 60 inches or more, and depth to hard bedrock is more than 6 feet. Reaction ranges from strongly acid to very strongly acid in all horizons except where the surface layer has been limed. Some pedons have a few fragments of sandstone, shale, or chert.

The A horizon is 4 to 8 inches thick. This horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 2 through 4. Texture is fine sandy loam or sandy loam.

If present, the B1 horizon is 3 to 8 inches thick. Texture is fine sandy loam or loam. This horizon has hue of 10YR, 7.5YR, or 5YR; value of 5; and chroma of 4 or 6.

The B2t horizon has hue of 5YR, 2.5YR, or 10R; value of 4 or 5; and chroma of 6 or 8. Texture is sandy clay loam, clay loam, or loam. The lower part of the B2t in most pedons is mottled or has multicolored streaks.

Barfield series

The Barfield series consists of shallow, well drained, moderately slowly permeable soils that formed in limestone residuum. These soils are on the lower parts of mountains in the northern part of the county. Slope ranges from 10 to 50 percent.

Barfield soils are geographically associated with Birmingham, Bodine, and Tupelo soils. These soils are deeper to bedrock.

Typical pedon of Barfield stony silty clay loam in an area of Barfield-Rock outcrop complex, steep, in a wooded area about 2 miles northwest of Clay, 1,000 feet east and 100 feet south of the northwest corner of sec. 23, T. 15 S., R. 1 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) stony silty clay loam; moderate medium granular structure; friable; many fine, medium, and large roots; common limestone stones and boulders; neutral; clear smooth boundary.

B2—4 to 11 inches; dark brown (10YR 3/3) stony silty clay; moderate medium subangular blocky structure; firm; common fine, medium, and large roots; few fine and medium root pores; many limestone fragments; neutral; gradual irregular boundary.

R—11 inches; hard limestone bedrock.

Solum thickness and depth to hard limestone bedrock range from 8 to 20 inches. Reaction is slightly acid to mildly alkaline. Base saturation is more than 50 percent in all horizons. Content of fragments of limestone ranges from few to 25 percent throughout.

The A1 horizon is 3 to 8 inches thick and has stony silty clay loam or silty clay texture. This horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or 3.

The B2 horizon is stony silty clay loam, silty clay, or clay. This horizon has hue of 10YR or 2.5YR, value of 2 through 4, and chroma of 2 through 4.

Birmingham series

The Birmingham series consists of moderately deep, well drained, moderately permeable cobbly soils that formed in ironstone and red sandstone residuum. These soils are generally on mountaintops and upper parts of mountainsides. Slope ranges from 15 to 35 percent.

Birmingham soils are geographically associated with Barfield, Bodine, Fullerton, and Nauvoo soils. Barfield soils are shallow to limestone bedrock. Bodine and Fullerton soils are deep to bedrock. Nauvoo soils have fewer fragments than Birmingham soils.

Typical pedon of Birmingham cobbly loam in an area of Bodine-Birmingham association, steep, in a forest on Red Mountain on the east side of Birmingham, about 1 mile north of Irondale, 2,000 feet east and 400 feet south of the northwest corner of sec. 13, T. 17 S., R. 2 W.

A1—0 to 5 inches; dark reddish brown (2.5YR 3/4) cobbly loam (2.5YR 3/4) dry; moderate medium granular structure; friable; many fine, medium, and large roots; about 30 percent by volume of ironstone and sandstone cobbles, 3 to 8 inches in diameter, and about 20 percent by volume of fragments smaller than 3 inches in diameter; slightly acid; clear wavy boundary.

B2t—5 to 29 inches; dusky red (10R 3/4) cobbly clay loam; dark red (10R 3/6) dry; moderate fine subangular blocky structure; friable; common fine, medium, and large roots; about 35 percent by volume of ironstone and sandstone fragments, 3 to 8 inches in diameter, few fragments larger than 8 inches in diameter, and about 15 percent by volume of fragments smaller than 3 inches in diameter; very strongly acid; clear irregular boundary.

Cr—29 to 49 inches; dark colored weathered ironstone and sandstone that has about 15 percent dusky red clay loam and roots in cracks of rock; abrupt irregular boundary.

R—49 inches; hard red sandstone bedrock.

Solum thickness and depth to the Cr horizon are 20 to 40 inches. Depth to hard red sandstone bedrock is 40 to 60 inches or more. Reaction of all horizons ranges from slightly acid to very strongly acid. Most pedons contain 15 to 35 percent red sandstone and ironstone cobbles and a similar amount of smaller fragments.

The A1 horizon is 2 to 6 inches thick. This horizon has hue of 2.5YR or 5YR, value of 2 or 3, and chroma of 2 through 4. Texture is cobbly or gravelly loam or silt loam.

The B2t horizon has hue of 2.5YR or 10R, value of 3, and chroma of 4 or 6. Texture is cobbly clay loam or cobbly loam.

The Cr horizon consists of fragments of ironstone and red sandstone. This horizon contains up to 30 percent soil material in cracks between fragments.

Bodine series

The Bodine series consists of deep, somewhat excessively drained, moderately rapidly permeable cherty soils that formed in residuum weathered from chert and cherty limestone. These soils are on steep uplands and prominent ridges on some mountains along the edges of limestone valleys. Slope ranges from 10 to 45 percent.

Bodine soils are geographically associated with Allen, Barfield, Birmingham, Decatur, Etowah, Fullerton, Ketona, Sullivan, and Tupelo soils. Sullivan soils are subject to flooding. All of the remaining upland soils, except Barfield and Birmingham soils, have fewer fragments than Bodine soils. Barfield and Birmingham soils are shallower to bedrock.

Typical pedon of Bodine cherty silt loam in an area of Bodine-Fullerton association, steep, in a wooded area about 3 miles southwest of Leeds, 1,900 feet east and

1,400 feet north of the southwest corner of sec. 35, T. 17 S., R. 1 W.

A1—0 to 4 inches; brown (10YR 4/3) cherty silt loam; moderate medium granular structure; very friable; many fine and medium roots; about 30 percent angular chert fragments; strongly acid; clear smooth boundary.
B1—4 to 12 inches; yellowish brown (10YR 5/6) very cherty loam; moderate fine subangular blocky structure; friable; common fine and medium roots; about 50 percent angular chert fragments; strongly acid; clear wavy boundary.
B21t—12 to 36 inches; strong brown (7.5YR 5/6) very cherty loam; moderate fine subangular blocky structure; friable; few fine and medium roots; thin discontinuous clay films on faces of peds; about 70 percent angular chert fragments; strongly acid; gradual wavy boundary.
B22t—36 to 72 inches; yellowish red (5YR 5/8) very cherty clay loam; moderate fine subangular blocky structure; friable; few fine roots; thin discontinuous clay films on faces of peds; about 70 percent angular chert fragments; strongly acid.

Solum thickness and depth to hard bedrock are 72 inches or more. Reaction ranges from strongly acid to very strongly acid in all horizons. In all pedons fragments of chert are mostly less than 2 inches in diameter but range up to 10 inches. The amount of chert fragments ranges from 25 to 50 percent in the A horizon and 35 to 80 percent in the B2t horizon.

The A1 horizon is 3 to 6 inches thick. This horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. Texture is very cherty or cherty silt loam.

If present, the B1 horizon is 5 to 9 inches thick. This horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 4 or 6. Texture is very cherty loam or very cherty silt loam.

The B2t horizon has hue of 10YR through 5YR, value of 4 through 6, and chroma of 4 through 8. Texture is very cherty loam, very cherty silty clay loam, or very cherty clay loam. In some pedons, the lower part of the B2t horizon has mottles in shades of yellow, red, or brown.

Decatur series

The Decatur series consists of deep, well drained, moderately permeable soils that formed in cherty limestone colluvium or residuum. These soils are on limestone valley uplands. Slope ranges from 2 to 15 percent.

Decatur soils are geographically associated with Bodine, Etowah, Fullerton, Ketona, Sullivan, and Tupelo soils. Bodine and Fullerton soils have more fragments of chert. Etowah soils have a loamy B2t horizon. Ketona soils are poorly drained. Sullivan soils are subject to flooding. Tupelo soils are moderately well drained and shallower to bedrock.

Typical pedon of Decatur silt loam, 2 to 8 percent slopes, in a pasture about 1 mile southwest of McCalla, 700 feet north and 900 feet west of the southeast corner of sec. 2, T. 20 S., R. 5 W.

Ap—0 to 7 inches; dark reddish brown (5YR 3/4) silt loam; moderate medium granular structure; friable; common fine, medium, and large roots; few small chert fragments; few small black concretions; strongly acid; clear smooth boundary.
B2t—7 to 72 inches; dark red (2.5YR 3/6) clay; strong medium subangular blocky structure; friable; few fine and medium roots; few fine root pores; thick clay films on faces of peds; few small chert fragments; few small black concretions; strongly acid.

Solum thickness and depth to hard bedrock are 72 inches or more. Reaction ranges from medium acid to very strongly acid in all horizons except where the surface layer has been limed. In most pedons, there are brown or black concretions. In some pedons, there are few small fragments of chert or limestone.

The Ap horizon is 3 to 9 inches thick. This horizon has hue of 5YR or 2.5YR, value of 2 or 3, and chroma of 2 through 4. Texture is loam, silt loam, or silty clay loam.

The B2t horizon has hue of 2.5YR and 10R, value of 3, and chroma of 4 and 6. Texture is clay, silty clay, or silty clay loam.

Docena series

The Docena series consists of deep, moderately well drained soils that formed in moderately permeable alluvium and underlying slowly permeable weathered shale residuum. These soils are on upland depressional areas and toe slopes and near the heads of drainageways. The high water table fluctuates between 1 1/2 and 3 feet during the winter and early in spring. Slope ranges from 0 to 4 percent.

Docena soils are geographically associated with Albertville, Holston, Montevallo, Nauvoo, State, Sullivan, and Townley soils. These soils are well drained.

Typical pedon of Docena silt loam, in an area of Docena complex, 0 to 4 percent slopes, in a pasture about 3 miles east of Bessemer, 1,000 feet east and 1,900 feet south of the northwest corner of sec. 25, T. 19 S., R. 4 W.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many fine and medium roots; slightly acid; clear wavy boundary.

B21t—4 to 26 inches; brownish yellow (10YR 6/6) silt loam; few medium distinct light brownish gray (10YR 6/2) and common medium faint light yellowish brown (10YR 6/4) mottles; weak fine structure and medium subangular blocky; friable; common fine and few medium roots; common fine and medium root pores; thin discontinuous clay films on faces of peds; very strongly acid; diffuse wavy boundary.

B22t—26 to 40 inches; mottled brownish yellow (10YR 6/6), light yellowish brown (10YR 6/4), and light gray (10YR 7/2) silt loam; weak fine structure and medium subangular blocky; friable; few fine roots, common fine root pores; thin discontinuous clay films on faces of peds; very strongly acid; gradual wavy boundary.

IIB23t—40 to 58 inches; mottled brownish yellow (10YR 6/6), gray (10YR 6/1), and reddish yellow (7.5YR 6/8) silty clay loam; moderate coarse structure and medium subangular blocky; firm; few fine roots; common fine root pores; thick continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

IIC—58 to 65 inches; mottled brownish yellow (10YR 6/6), gray (10YR 6/1), and reddish yellow (7.5YR 6/8) silty clay loam; firm; strongly acid.

Solum thickness is commonly 40 to 60 inches but ranges from 30 to 60 inches or more. Depth to weathered shale or sandstone is 60 inches or more. Reaction ranges from medium acid to very strongly acid except where the surface layer has been limed. In some pedons, black or brown manganese and iron concretions or soft accumulations are present.

The A horizon has hue to 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. If the A horizon has value of 3, thickness of the horizon is less than 6 inches. Texture is generally silt loam, but deposits from soil on eroded surrounding uplands have a loam or fine sandy loam texture.

The B1 or A2 horizon, if present, is silt loam or loam. These horizons have hue of 7.5YR through 2.5YR, value of 5 or 6, and chroma of 4 or 6.

The upper B2t horizon has hue of 10YR and 7.5YR, value of 4 through 6, and chroma of 4 through 8; mottles have chroma of 2 or less in the upper 24 inches. Texture is silt loam or silty clay loam. The lower B2t horizon is mottled in shades of red, brown, yellow, and gray, or it has the same hue, value, and chroma as the upper B2t horizon and has common to many mottles of chroma of 2 or less.

The IIB2t horizon, if present, formed in residual shale and has silty clay or silty clay loam texture, or it formed in alluvium and has loam, clay loam, silty clay loam, or silt loam texture and is slightly brittle in 40 percent or less of the mass. The horizon is 30 inches or more below the surface.

The IIC horizon is variable in texture and color. It is highly weathered shale, which may have layers of soft coal, or alluvium or colluvium that has few to many concretions and gravel.

Etowah series

The Etowah series consists of deep, well drained, moderately permeable soils that formed in cherty alluvium and colluvium. These soils are on colluvial fans, foot slopes, toe slopes, and high stream terraces that are at lower elevations than surrounding ridges. Slope ranges from 2 to 8 percent.

Etowah soils are geographically associated with Bodine, Decatur, Fullerton, and Sullivan soils. Bodine and Fullerton soils contain more chert fragments than Etowah soils. Decatur soils have a clayey B2t horizon. Sullivan soils are subject to flooding.

Typical pedon of Etowah loam, 2 to 8 percent slopes, in a pasture about 1 mile southwest of Trussville, 3,400 feet east and 900 feet north of the southwest corner of sec. 27, T. 16 S., R. 1 W.

Ap—0 to 6 inches; dark brown (7.5YR 3/2) loam; moderate medium granular structure; friable; about 5 percent angular chert fragments, less than 1 centimeter in diameter; common fine and medium roots; medium acid; clear smooth boundary.

B21t—6 to 52 inches; yellowish red (5YR 4/6) silty clay loam; moderate fine and medium subangular blocky structure; friable; about 10 percent angular chert fragments, less than 1 centimeter in diameter; few small concretions, few fine roots and root pores; thin continuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—52 to 65 inches; yellowish red (5YR 4/6) silty clay loam; common medium distinct strong brown (7.5YR 5/8) and light yellowish brown (10YR 6/4) mottles; moderate coarse structure and medium angular blocky; firm; about 10 percent angular chert fragments less than 1 inch in diameter; few fine roots; few fine root pores; thin continuous clay films on faces of peds; very strongly acid.

Solum thickness is 60 inches or more. Depth to hard bedrock is 6 feet or more. Reaction ranges from strongly acid to very strongly acid in all horizons except where the surface layer has been limed. In some pedons, brown or black concretions are few to common. In most pedons, fragments of angular chert that are generally less than 1 inch in diameter range from 2 to 15 percent, by volume, throughout.

The Ap horizon is 5 to 10 inches thick. This horizon has hue of 5YR through 10YR, value of 3, and chroma of 2 through 4. Texture is loam or silt loam.

The B2t horizon has hue of 2.5YR through 10YR, value of 4 or 5, and chroma of 6 or 8. In some pedons,

this horizon has mottles in the lower part. Texture is silty clay loam or clay loam.

Fullerton series

The Fullerton series consists of deep, well drained, moderately permeable cherty soils that formed in cherty residuum. These soils are on chert ridges and uplands. Slope ranges from 8 to 25 percent.

Fullerton soils are geographically associated with Birmingham, Bodine, Decatur, Etowah, Ketona, Sullivan, and Tupelo soils. Birmingham soils are shallower to bedrock. Bodine soils contain more fragments of chert. Decatur and Etowah soils have fewer fragments of chert. Ketona soils are poorly drained. Sullivan soils are subject to flooding. Tupelo soils are shallower to bedrock and moderately well drained.

Typical pedon of Fullerton cherty silt loam in an area of Fullerton-Bodine complex, 8 to 15 percent slopes, in a pasture about 3/4 mile north of Argo, 1,900 feet south, and 900 feet east of the northwest corner of sec. 27, T. 15 S., R. 1 E.

Ap—0 to 6 inches; dark brown (10YR 3/3) cherty silt loam; moderate medium granular structure; friable; common fine and medium roots; about 15 percent by volume of fragments of chert, less than 1 inch in diameter; slightly acid; clear smooth boundary.

B21t—6 to 35 inches; yellowish red (5YR 4/6) cherty silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; common fine root pores; thin continuous clay films on faces of peds; about 15 percent by volume of fragments of chert, less than 1 inch in diameter; very strongly acid; diffuse wavy boundary.

B22t—35 to 65 inches; dark red (2.5YR 3/6) cherty silty clay loam; few medium prominent strong brown (7.5YR 5/6) mottles; strong medium subangular blocky structure; firm; thick continuous clay films on faces of peds; about 50 percent by volume of fragments of chert, mostly less than 2 inches in diameter; few 3 to 6 inch fragments of chert; very strongly acid.

Solum thickness is 60 inches or more. Depth to hard bedrock is 6 feet or more. Reaction of all horizons ranges from strongly acid to very strongly acid except where the surface layer has been limed. In most pedons, fragments of chert are less than 2 inches in diameter. Fragments of chert range from 5 to 20 percent by volume in the upper part of the pedon and from 15 to 50 percent in the lower part.

The A1 and A2 or Ap horizon is 4 to 8 inches thick. The A horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. Texture is cherty silt loam or cherty loam.

If present, the B1 horizon is 3 to 12 inches thick. This horizon has hue of 7.5YR or 10YR, value of 5, and chroma of 4 through 6. Texture is silt loam, loam, or silty clay loam, or has cherty counterparts.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 or 8. In many pedons, the lower part of the B2t horizon has value of 3. In some pedons, the lower part of the B2t horizon has mottles. Texture is silty clay loam or cherty silty clay loam.

Gorgas series

The Gorgas series consists of shallow, well drained, moderately rapidly permeable soils that formed in sandstone residuum. These soils are mostly on the back slope of Shades Mountain and several associated mountains and ridges. Slope ranges from 8 to 45 percent.

Gorgas soils are geographically associated with Hanceville, Leesburg, Nauvoo, and Mountevallo soils. Hanceville, Leesburg, and Nauvoo soils are deeper to bedrock. Montevallo soils are underlain by shale and siltstone.

Typical pedon of Gorgas fine sandy loam, in an area of Gorgas-Rock outcrop complex, 8 to 15 percent slopes, in a wooded area about 1 mile east of Irondale, 1,600 feet east and 1,900 feet south of the northwest corner of sec. 21, T. 17 S., R. 1 W.

A11—0 to 2 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate medium granular structure; very friable; few sandstone fragments; many fine, medium, and large roots; slightly acid; clear wavy boundary.

A12—2 to 6 inches; brown (10YR 4/3) fine sandy loam; moderate medium granular structure; very friable; few sandstone fragments; common fine and medium roots; medium acid; clear wavy boundary.

B2t—6 to 16 inches; strong brown (7.5YR 5/6) sandy loam; weak medium subangular blocky structure parting to moderate medium granular; very friable; sand grains coated and bridged with clay and silt; few sandstone fragments; few fine to medium roots; strongly acid; gradual irregular boundary.

R—16 inches; hard sandstone bedrock.

Solum thickness is 10 to 20 inches. Reaction of the A horizon is slightly acid to very strongly acid. Reaction of the B horizon ranges from strongly acid to very strongly acid. In most pedons, there are a few fragments of sandstone.

The A horizon is 3 to 6 inches thick. This horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 4. In some pedons, the A horizon has value of 2 or 3 and is less than 4 inches thick. Texture of the A horizon is sandy loam or fine sandy loam.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. Texture is sandy loam or loam.

Hanceville series

The Hanceville series consists of deep, well drained, moderately permeable soils that formed in sandstone residuum. Most of these soils are on mountains and prominent ridges that are roughly parallel and extend in a northeast-southwest direction across the county. Slope ranges from 2 to 15 percent.

Hanceville soils are geographically associated with Gorgas, Leesburg, and Nauvoo soils. Gorgas soils are shallow to sandstone bedrock. Leesburg soils are cobbly and have a loamy B2t horizon. Nauvoo soils are shallower to sandstone rock and have a loamy B2t horizon.

Typical pedon of Hanceville fine sandy loam, 8 to 15 percent slopes, in a wooded area about 2 miles south of Trussville, 1,900 feet east and 700 feet north of the southwest corner of sec. 36, T. 16 S., R. 1 W.

A1—0 to 5 inches; dark brown (10YR 3/3) fine sandy loam; weak medium granular structure; very friable; common fine, medium, and large roots; 2 percent by volume of quartzite and sandstone pebbles; slightly acid; clear smooth boundary.

B1—5 to 9 inches; yellowish red (5YR 4/6) fine sandy loam; weak medium subangular blocky structure; friable; common fine, medium, and large roots; 2 percent by volume of quartzite and sandstone pebbles; strongly acid; clear smooth boundary.

B2t—9 to 70 inches; dark red (2.5YR 3/6) clay; moderate medium subangular blocky structure; friable; few fine, medium, and large roots; few fine root pores; 2 percent by volume of quartzite and sandstone pebbles; moderately thick continuous clay films on faces of peds; very strongly acid.

Solum thickness and depth to sandstone bedrock are 70 inches or more. Reaction ranges from strongly acid to very strongly acid in all horizons except where the surface layer has been limed. In some pedons, there are small, rounded, black concretions.

The A1 or Ap horizon is 4 to 7 inches thick. This horizon has hue of 5YR, 7.5YR, or 10YR; value of 3; and chroma of 3 or 4. Texture is fine sandy loam or loam.

If present, the B1 horizon is 3 to 6 inches thick. Texture is fine sandy loam or sandy clay loam.

The B2t horizon has hue of 10R or 2.5YR, value of 3, and chroma of 4 or 6. Texture is clay or clay loam.

Holston series

The Holston series consists of deep, well drained, moderately permeable soils that formed in alluvium and sandstone, chert, and shale colluvium. These soils are on gently sloping colluvial fans, toe slopes, and high stream terraces. Most areas of these soils are in Shades Valley. Slope ranges from 2 to 8 percent.

Holston soils are geographically associated with Albertville, Allen, Docena, Leesburg, State, Sullivan, and Townley soils. Albertville soils have a clayey B2t horizon and are shallower to shale. Allen soils have a redder B2t horizon. Docena soils are moderately well drained. Leesburg soils are cobbly. State and Sullivan soils are subject to flooding. Townley soils are shallower to shale.

Typical pedon of Holston loam, 2 to 8 percent slopes, in a wooded area about 4 miles west of Greenwood, 3,000 feet west and 2,000 feet south of the northeast corner of sec. 7, T. 20 S., R. 4 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) loam; moderate medium granular structure; friable; many fine, medium, and large roots; few fragments of chert and sandstone; strongly acid; clear wavy boundary.

B1—6 to 14 inches; yellowish brown (10YR 5/4) loam; weak medium subangular blocky parting to moderate medium granular structure; friable; many fine and medium and few large roots; few fragments of chert and sandstone; very strongly acid; gradual wavy boundary.

B21t—14 to 26 inches; yellowish brown (10YR 5/6) loam; weak medium subangular blocky structure; friable; common fine and medium roots; common fine root pores; clay bridgings between grains; few fragments of chert and sandstone; very strongly acid; gradual wavy boundary.

B22t—26 to 34 inches; strong brown (7.5YR 5/6) clay loam; moderate medium subangular blocky structure; friable; few fine and medium roots; common fine root pores; thin continuous clay films on faces of peds; few chert and sandstone fragments; very strongly acid; gradual wavy boundary.

B23t—34 to 65 inches; strong brown (7.5YR 5/6) clay loam; common medium distinct yellowish red (5YR 5/6) and light yellowish brown (10YR 6/4) mottles; moderate medium structure and coarse angular blocky; firm; few fine roots; few fine root pores; thick continuous clay films on faces of peds; common chert and sandstone fragments; very strongly acid.

Solum thickness is 60 inches or more. Depth to hard bedrock is 6 feet or more. Reaction ranges from strongly to very strongly acid in all horizons except where the surface layer has been limed.

The Ap or A1 horizon is 5 to 9 inches thick. This horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. Texture is silt loam, fine sandy loam, or loam. The A horizon has 10 percent or less, small sandstone and angular chert fragments.

If present, the B1 horizon is 3 to 10 inches thick. This horizon has hue of 10YR, value of 5 or 6, and chroma of 4 through 8. Texture is loam and has 10 percent or less, small sandstone and angular chert fragments.

The B2t horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8. In most pedons, the lower part of the B2t horizon has mottles in shades of yellow, brown, or red. In some pedons, the B2t horizon has gray mottles at depths of more than 40 inches. Texture is loam, clay loam, sandy clay loam, or silty clay loam. In some pedons, the B2t horizon has 2 to 25 percent fine sandstone and angular chert fragments. In these pedons, the amount of fragments increases with depth.

Ketona series

The Ketona series consists of deep, poorly drained, slowly permeable soils that formed in limestone residuum and alluvium. These soils are in depressional areas and drainageways in limestone valleys and on flat areas adjacent to streams. Some areas are subject to ponding by runoff from surrounding uplands. Other areas are subject to frequent, brief flooding from stream overflow. These soils are saturated during the winter and early in spring. The seasonal high water table is at or near the surface. Slope ranges from 0 to 4 percent.

Ketona soils are geographically associated with Bodine, Decatur, Fullerton, Sullivan, and Tupelo soils. Bodine soils contain more fragments of chert. Decatur and Fullerton soils are well drained. Sullivan soils have a loamy B2 horizon and are well drained. Tupelo soils are moderately well drained and are not subject to flooding.

Typical pedon of Ketona silty clay loam, in an area of Sullivan-Ketona complex, 0 to 2 percent slopes, in a pasture about 1 mile northeast of McCalla, 1,600 feet south of the northeast corner of sec. 36, T. 19 S., R. 5 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay loam; strong medium granular structure; friable; many fine and medium roots; neutral; clear wavy boundary.

B21tg—6 to 30 inches; gray (10YR 5/1) silty clay; common coarse distinct light olive brown (2.5Y 5/4) and yellowish brown (10YR 5/6) mottles; moderate coarse angular blocky structure and weak medium subangular blocky; firm, plastic; common fine and medium roots; few fine root pores; thin continuous clay films or pressure faces on faces of peds; few small, rounded limestone fragments; dark gray silty clay loam surface material fill old cracks; mildly alkaline; diffuse wavy boundary.

B22tg—30 to 50 inches; gray (10YR 6/1) silty clay; many coarse distinct yellowish brown (10YR 5/6) mottles; moderate coarse angular blocky structure and weak medium subangular blocky; firm, plastic; few fine and medium roots; thin continuous clay films or pressure faces on faces of peds; few intersecting slickensides; few small, rounded limestone fragments; moderately alkaline; abrupt irregular boundary.

R—50 inches; hard limestone bedrock.

Solum thickness and depth to limestone bedrock range from 40 to 60 inches or more. Reaction ranges from slightly acid to moderately alkaline in all horizons. In some pedons, recent alluvial sediment is deposited over the A horizon. All horizons, except the recent alluvial layers, crack when dry. In many pedons, there are small, round, brown or black concretions and limestone fragments.

The A1 or Ap horizon is 5 to 10 inches thick. This horizon has hue of 10YR, value of 2 through 4, and chroma of 1 through 3. Texture is silty clay loam or silt loam.

If present, the thin B1 horizon is silty clay loam or clay loam.

The B2t horizon is gray or mottled in shades of gray, yellow, and brown. Gray colors have hue of 10YR or 2.5Y, value of 3 through 6, and chroma of 0 through 2. Yellow and brown colors have hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 through 8. Texture is clay or silty clay. In some pedons, the percentage of yellow and brown colors increases with depth.

Leesburg series

The Leesburg series consists of deep, well drained, moderately permeable, cobbly soils that formed in loamy colluvium and underlying shale residuum. These soils are on steep slopes on the scarp side (rock outcrop side) of mountains in areas of sandstone and shale. Slope ranges from 15 to 45 percent.

Leesburg soils are geographically associated with Allen, Gorgas, Hanceville, Holston, Montevallo, Nauvoo, Sullivan, and Townley soils. Allen, Hanceville, and Holston soils have fewer fragments. Allen soils have a redder B2t horizon. Anniston soils have a clayey B2t horizon. Gorğas, Montevallo, Nauvoo, and Townley soils are shallower to shale. Sullivan soils are subject to flooding.

Typical pedon of Leesburg cobbly fine sandy loam, in an area of Leesburg-Rock outcrop complex, steep, in a wooded area about 2 miles south of Trussville, 100 feet east and 800 feet south of the northwest corner of sec. 1, T. 17 S., R. 1 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) cobbly fine sandy loam; moderate fine structure and medium granular; very friable; 25 percent by volume of sandstone cobbles; many fine, medium, and large roots; strongly acid; clear wavy boundary.

B1—4 to 9 inches; yellowish brown (10YR 5/4) cobbly fine sandy loam; weak medium subangular blocky structure and moderate medium granular; friable; 25 percent by volume of sandstone cobbles; common fine, medium, and large roots; common fine root pores; strongly acid; gradual wavy boundary.

B21t—9 to 25 inches; yellowish brown (10YR 5/6) cobbly fine sandy loam; weak fine structure and medium subangular blocky; friable; 25 percent by volume of sandstone cobbles; common fine, medium, and large roots; many fine and medium root pores; strongly acid; gradual wavy boundary.

B22t—25 to 40 inches; strong brown (7.5YR 5/6) cobbly sandy clay loam; moderate fine structure and medium subangular blocky; friable; 20 percent by volume of sandstone cobbles; common fine, medium, and large roots; many fine root pores; strongly acid; clear wavy boundary.

IIB23t—40 to 55 inches; mottled yellowish red (5YR 5/6), yellowish brown (10YR 5/6), and light yellowish brown (10YR 6/4) silty clay loam; moderate medium subangular blocky structure; friable; 10 percent by volume of small shale fragments; few fine and medium roots; few fine root pores; strongly acid; gradual wavy boundary.

IIB24t—55 to 66 inches; mottled yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), strong brown (7.5YR 5/6), yellowish red (5YR 5/6), and light brownish gray (10YR 6/2) silty clay loam; moderate medium subangular blocky structure; firm; 15 percent by volume of small shale fragments; few fine and medium roots; many black manganese accumulations; strongly acid.

Solum thickness is 60 inches or more and depth to bedrock is 6 feet or more. Reaction ranges from strongly acid to very strongly acid throughout. Fragments of sandstone in the A1, B1, and B2t horizons range from 10 to 35 percent by volume. Fragments of shale in the IIB2t horizon are 15 percent or less.

The A1 horizon is cobbly fine sandy loam or cobbly loam and is 3 to 6 inches thick. This horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 4. Fragments of sandstone cover 10 to 80 percent of this horizon.

The B1 horizon is present in most pedons. It is cobbly fine sandy loam, cobbly loam, or cobbly sandy clay loam and is 4 to 7 inches thick. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 4 through 8.

The B2t horizon extends to depths of 40 inches or more and is cobbly clay loam, cobbly sandy clay loam, cobbly fine sandy loam, or cobbly loam. This horizon has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 6 or 8.

The IIB2t horizon is clay loam, silty clay loam, or silty clay. This horizon has colors similar to those of the B2t horizon and includes hue of 5YR. In many pedons, this horizon is mottled in shades of red, brown, and gray.

Montevallo series

The Montevallo series consists of shallow, well drained, moderately permeable soils that formed in shale and siltstone residuum. These soils are on steep side slopes of strongly dissected plateau uplands that are underlain by shale and sandstone. Slope ranges from 15 to 55 percent.

Montevallo soils are geographically associated with Allen, Docena, Gorgas, Leesburg, Nauvoo, Palmerdale, State, Sullivan, and Townley soils. Allen, Leesburg, Nauvoo, and Townley soils are deeper to bedrock. Allen, Nauvoo, and Townley soils have fewer fragments than Montevallo soils. Docena soils are moderately well drained. Gorgas soils are underlain by hard sandstone bedrock. Palmerdale soils formed in coal mining rock spoil. State and Sullivan soils are subject to flooding.

Typical pedon of Montevallo shaly silt loam in an area of Montevallo-Nauvoo association, steep, in a wooded area about 1 mile west of Graysville, 1,100 feet north and 3,500 feet west of the southeast corner of sec. 19, T. 16 S., R. 4 W.

A11—0 to 2 inches; very dark gray (10YR 3/1) shaly silt loam, upper 1/2 inch black (10YR 2/1) and high in humus; moderate fine granular structure; friable; many fine roots; strongly acid; clear wavy boundary.

A12—2 to 6 inches; dark grayish brown (10YR 4/2) shaly silt loam; weak fine granular structure; friable; many fine and medium roots; strongly acid; lower 2 inches is mixed with from 5 to 15 percent material like that of the B horizon; gradual wavy boundary.

B2—6 to 16 inches; yellowish brown (10YR 5/4) very shaly silt loam; weak fine subangular blocky structure; friable; common fine roots; few large roots; about 70 percent by volume of fragments of silty shale; strongly acid; gradual irregular boundary.

Cr—16 to 36 inches; light yellowish brown (10YR 6/4), weakly cemented, fractured silty shale containing less than 5 percent by volume of fines as coatings on fragments of shale in cracks.

Solum thickness ranges from 10 to 20 inches. Reaction ranges from medium to strongly acid in all horizons. Fragments of shale and siltstone range from 10 to 40 percent in the A1 horizon and from 35 to 90 percent in the B2 horizon.

The A1 horizon is 3 to 6 inches thick and is shaly silt loam or shaly loam. This horizon has hue of 10YR, value of 3 or 4, and chroma of 1 through 3.

The B2t horizon is shaly or very shaly silt loam or silty clay loam. This horizon has hue of 10YR or 7.5YR, value of 4 through 6, and chroma of 4 or 6.

The Cr horizon is fractured shale and siltstone that is weathered to depths of 6 feet or more.

Nauvoo series

The Nauvoo series consists of deep, well drained, moderately permeable soils that formed in residuum weathered from sandstone and interbedded sandstone,

siltstone, and shale. These soils are on uplands. Slope ranges from 2 to 25 percent.

Nauvoo soils are geographically associated with Allen, Birmingham, Docena, Gorgas, Hanceville, Leesburg, Montevallo, Palmerdale, State, Sullivan, and Townley soils. Allen, Hanceville, and Leesburg soils are deeper to bedrock. Hanceville soils also have a clayey B2t horizon. Birmingham soils have more fragments. Docena soils are moderately well drained. Gorgas and Montevallo soils are shallow to bedrock. Montevallo soils also have more fragments. Palmerdale soils formed in coal strip mine spoil. State and Sullivan soils are subject to flooding. Townley soils have a clayey B2t horizon.

Typical pedon of Nauvoo fine sandy loam, 8 to 15 percent slopes, in a wooded area about 2 miles south of Mt. Olive and 3 miles west of Gardendale, 2,700 feet north and 600 feet west of the southeast corner of sec. 17, T. 16 S., R. 3 W.

A11—0 to 4 inches; very dark grayish brown (10YR 3/2) fine sandy loam; moderate medium granular structure; very friable; many fine and medium and few large roots; slightly acid; clear smooth boundary.

A12—4 to 7 inches; dark brown (10YR 4/3) fine sandy loam; moderate medium granular structure; very friable; many fine and medium and few large roots; slightly acid; clear wavy boundary.

A2—7 to 12 inches; yellowish brown (10YR 5/4) fine sandy loam, weak coarse subangular blocky structure parting to moderate medium granular; friable; common fine and medium and few large roots; medium acid; clear wavy boundary.

B21t—12 to 24 inches; yellowish red (5YR 5/6) clay loam; moderate medium structure and coarse subangular blocky; friable; common fine and medium and few large roots; thin discontinuous clay films on faces of peds; strongly acid; gradual wavy boundary.

B22t—24 to 34 inches; yellowish red (5YR 4/6) clay loam; moderate medium structure and coarse subangular blocky; friable; common fine and medium and few large roots; thin continuous clay films on faces of peds; common weathered sandstone fragments; strongly acid; gradual irregular boundary.

C—34 to 46 inches; coherent, massive, red and yellow sandy loam that have relict rock structure; few clay films in cracks; strongly acid; gradual wavy boundary.

Cr—46 to 60 inches; soft, highly weathered, level bedded, red and yellow sandstone.

Solum thickness ranges from 30 to 50 inches. Depth to weathered rock is 40 to 60 inches. Reaction ranges from strongly acid to very strongly acid in all horizons except where the surface layer has been limed. Coarse sandstone and shale fragments make up 15 percent or less of any horizon and generally increase with depth.

The A1 of Ap horizon is 3 to 7 inches thick and has fine sandy loam or loam texture. This horizon has hue of 10YR, value of 3 through 5, and chroma of 2 through 4. If the A1 horizon has value of 3, it is less than 6 inches thick.

If present, the A2 horizon or B1 horizon is fine sandy loam or loam. This horizon has hue of 10YR or 2.5YR, value of 5 or 6, and chroma of 4 through 8. Thickness ranges from 4 to 8 inches.

The B2t horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 4 through 8. Texture is clay loam or sandy clay loam. In some pedons, the lower part of the B2t horizon is mottled in shades of yellow, red, and brown, or it has multicolored streaks.

If present, the B3 or C horizon has color and texture similar to those of the B1 and B2t horizons except that it is commonly mottled.

The Cr horizon is highly weathered sandstone or interbedded sandstone and shale. If present, the R horizon is hard sandstone bedrock at a depth of 60 inches or more.

Palmerdale series

The Palmerdale series consists of deep, somewhat excessively drained, moderately rapidly permeable, very shaly soils that formed in sandstone, shale, and siltstone debris created by surface mining of coal. These soils are on uplands. Slope ranges from 15 to 60 percent.

Palmerdale soils are geographically associated with Montevallo, Nauvoo, and Townley soils. These soils formed in sandstone and shale residuum.

Typical pedon of Palmerdale very shaly silt loam, in an area of Palmerdale complex, steep, in a surface mined area about 1 1/4 miles north of Adger, 1,600 feet north and 1,200 feet east of the southwest corner of sec. 7, T. 19 S., R. 5 W.

—0 to 1 inch; shale, siltstone, and sandstone fragments.

A1—1 to 6 inches; dark gray (10YR 4/1) very shaly silt loam; weak medium granular structure; very friable; few fine roots; many shale, siltstone, and sandstone fragments; extremely acid; gradual irregular boundary.

C—6 to 60 inches; dark gray (10YR 4/1) very shaly silt loam; friable; few fine roots; many shale, siltstone, and sandstone fragments; extremely acid.

Solum thickness and depth to bedrock are 60 inches or more. Reaction ranges from strongly acid to extremely acid in all horizons. Coarse fragments make up 40 to 85 percent of all horizons. Fragments of sandstone, shale, and siltstone generally range in size from 1 inch to 3 feet long. In most pedons, they have small pockets of clayey material. All horizons have hue of 10YR, value of 3 or 4, and chroma of 1 through 3. Texture is shaly or very shaly silt loam.

State series

The State series consists of deep, well drained, moderately permeable soils that formed in alluvium. These soils are on high flood plains and low stream terraces in drainage basins dominated by sandstone and shale materials. State soils are subject to occasional flooding for brief periods. The high water table fluctuates between 4 and 6 feet during the winter and spring. Slope ranges from 0 to 2 percent.

State soils are geographically associated with Docena, Holston, Montevallo, Nauvoo, Sullivan, and Townley soils. Holston, Montevallo, Nauvoo, and Townley soils are not subject to flooding. Docena soils are moderately well drained. Sullivan soils have a B2 horizon.

Typical pedon of State silt loam, in an area of Sullivan-State complex, 0 to 2 percent slopes, in a pasture about 2 miles southwest of Greenwood, 150 feet south and 1,900 feet east of the northwest corner of sec. 16, T. 20 S., R. 4 W.

Ap—0 to 4 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; very friable; many fine and medium roots; medium acid; abrupt wavy boundary.

A2—4 to 9 inches; yellowish brown (10YR 5/4) silt loam; weak fine granular structure; very friable; many fine and medium roots; strongly acid; clear wavy boundary.

B21t—9 to 25 inches; yellowish brown (10YR 5/6) clay loam; weak medium subangular blocky structure; friable; common fine and medium roots; grains coated and bridged with silt; strongly acid; gradual wavy boundary.

B22t—25 to 40 inches; yellowish brown (10YR 5/6) clay loam; common fine faint very pale brown (10YR 7/4) mottles; weak medium subangular blocky structure; friable; few fine roots; grains coated and bridged with silt; strongly acid; gradual wavy boundary.

C—40 to 60 inches; mottled yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), very pale brown (10YR 7/4), and white (10YR 8/2) sandy loam; strongly acid.

Solum thickness is 35 to 60 inches. Reaction is strongly acid to very strongly acid in all horizons except where the surface layer has been limed. This soil commonly has recent deposits of alluvium on the surface.

The A horizon is 6 to 12 inches thick. This horizon has hue of 10YR or 7.5YR, value of 3 or 4, and chroma of 3 or 4. If the A horizon has value of 3 when moist, it is 6 when dry. Texture is silt loam or loam.

In some pedons, there is a thin A2 or B1 horizon of silt loam or loam.

The B2t horizon has hues of 10YR or 7.5YR, value of 5, and chromas of 4 through 8. In some pedons, the lower part of the B2t horizon is mottled in shades of yellow or brown. Texture of the B2t horizon is loam, clay loam, or sandy clay loam. In some pedons, portions of the lower part of the B horizon are compact and brittle when moist.

The C horizon is generally mottled and is sandy loam, loam, or silt loam.

Sullivan series

The Sullivan series consists of deep, well drained, moderately permeable soils that formed in recent alluvium. These soils are on flood plains. They are subject to frequent flooding for brief periods. The high water table fluctuates between 4 and 6 feet during the winter and early in spring. Slope ranges from 0 to 2 percent.

Sullivan soils are geographically associated with Docena, Ketona, and State soils. Docena soils are moderately well drained. Ketona soils are poorly drained and have a clayey B2t horizon. State soils have a B2t horizon. Sullivan soils are also associated with most of the upland soils in the county.

Typical pedon of Sullivan silt loam in an area of Sullivan-State complex, 0 to 2 percent slopes, in a pasture about 3 1/2 miles east of Morris, 2,000 feet east and 1,400 feet south of the northwest corner of sec. 16, T. 15 S., R. 2 W.

Ap—0 to 4 inches; dark brown (10YR 3/3) silt loam; moderate medium granular structure; friable; many fine and medium roots; few small coal fragments; very few fine flakes of mica; neutral; clear wavy boundary.

B21—4 to 20 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure parting to moderate medium granular; friable; common fine and medium roots; common fine root pores; few small coal fragments; few very fine flakes of mica; slightly acid; gradual wavy boundary.

B22—20 to 39 inches; very dark grayish brown (10YR 3/2) loam; weak medium subangular blocky structure parting to moderate medium granular; friable; common fine and medium roots; common fine root pores; few small coal fragments; few very fine flakes of mica; slightly acid; gradual wavy boundary.

C1—39 to 66 inches; dark brown (10YR 3/3) sandy loam; very friable; few fine roots; few small coal fragments; few very fine flakes of mica; slightly acid; diffuse irregular boundary.

Thickness of the A and B2 horizons is 20 to 50 inches. Depth to bedrock is 72 inches or more. Reaction ranges from neutral to medium acid in the A and B2 horizons. The A and upper part of the B2 horizon commonly have small fragments of coal.

The A1 or Ap horizon is 4 to 10 inches thick. This horizon has hue of 10YR, value of 3 or 4, and chroma of

3 or 4. If the A horizon has value of 3 when moist, it is 6 when dry. Texture is silt loam or loam.

The B2 horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 6. Texture is silt loam or loam. In some pedons, the lower part of the B2 horizon is mottled in shades of yellow, brown, or gray.

The C horizon has colors similar to those of the B2 horizon. Texture is silt loam, loam, or sandy loam or the gravelly counterparts.

The Sullivan soils in the map units of Sullivan and Ketona complexes are taxadjuncts to the Sullivan series because they have a surface mantle of recently deposited material in hue of 5YR.

Townley series

The Townley series consists of moderately deep, well drained, slowly permeable soils that formed in shale, siltstone, or interbedded shale, siltstone, and sandstone residuum. These soils are on uplands. Slope ranges from 8 to 15 percent.

Townley soils are geographically associated with Albertville, Docena, Holston, Leesburg, Montevallo, Nauvoo, Palmerdale, State, and Sullivan soils. Albertville, Holston, and Leesburg soils are deeper to bedrock. Docena soils are moderately well drained. Montevallo soils are shallow to shale and have more fragments. Nauvoo soils have loamy B2t horizons. Palmerdale soils formed in coal strip mine spoil. State and Sullivan soils are subject to flooding.

Typical pedon of Townley silt loam, in an area of Townley-Nauvoo complex, 8 to 15 percent slopes, in a wooded area about 1 1/2 miles northwest of Shannon, 1,500 feet west and 100 feet south of the northeast corner of sec. 6, T. 19 S., R. 3 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; moderate medium granular structure; friable; many fine, medium and large roots; few fine shale fragments; medium acid; abrupt wavy boundary.

B1—4 to 7 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; friable; common fine, medium, and large roots; common fine root pores; few fine shale fragments; very strongly acid; abrupt wavy boundary.

B2t—7 to 25 inches; yellowish red (5YR 5/6) silty clay; yellow and red weathered fragment streaks; strong coarse and medium angular blocky structure; firm; few fine, medium, and large roots; common fine root pores; thick continuous clay films on faces of peds; common shale fragments and weathered shale layers; very strongly acid; gradual wavy boundary.

Cr—25 to 32 inches; red and yellow, consolidated, weathered shale.

Solum thickness is 20 to 36 inches. Reaction ranges from strongly acid to very strongly acid in all horizons except where the surface layer has been limed. Depth to soft, consolidated shale is 20 to 40 inches.

The A1 or Ap horizon is 4 to 6 inches thick. This horizon has hue of 10YR or 7.5YR, value of 3 through 5, and chroma of 2 through 4. Texture is silt loam or loam.

In some pedons, there is a thin B1 horizon of silt loam, loam, or silty clay loam.

The B2t horizon is silty clay, clay, or silty clay loam. This horizon has hue of 2.5YR, 5YR, or 7.5YR; value of 4 or 5; and chroma of 6 through 8. In some pedons, the lower part of the B2t horizon is mottled or has multicolored streaks. Fragments of fine shale range from few to common in the B2t horizon and generally increase with depth.

In some pedons, there is a B3 or C horizon that has color and texture similar to those of the B2t horizon.

The Cr horizon is soft, weathered shale or siltstone or interbedded shale, siltstone, and sandstone.

Tupelo series

The Tupelo series consists of deep, moderately well drained, slowly permeable soils that formed in limestone residuum. These soils are on limestone valley uplands. The high water table fluctuates between 1 foot and 2 feet during winter and spring. Slope ranges from 0 to 4 percent.

Tupelo soils are geographically associated with Barfield, Bodine, Decatur, Fullerton, Ketona, and Sullivan soils. Barfield soils are shallow to limestone bedrock. Bodine soils contain more fragments of chert. Decatur and Fullerton soils are deeper to bedrock and are well drained. Ketona soils are poorly drained and subject to flooding. Sullivan soils are subject to flooding.

Typical pedon of Tupelo silt loam, 0 to 4 percent slopes, in a wooded area about 1/2 mile east of McCalla, 500 feet east and 900 feet south of the northwest corner of sec. 6, T. 20 S., R. 4 W.

A1—0 to 8 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct brown (10YR 5/3) mottles; weak medium subangular blocky structure and moderate medium granular; friable; common fine, medium and large roots; common medium black concretions; strongly acid; abrupt smooth boundary.

B1—8 to 14 inches; mottled brown (7.5YR 5/4) and yellowish brown (10YR 5/4) silty clay loam; moderate medium subangular blocky structure; firm; few fine, medium, and large roots; many fine root pores; thin patchy clay films on faces of some peds; common medium black concretions; medium acid; clear wavy boundary.

B21t—14 to 23 inches; mottled yellowish brown (10YR 5/6, 10YR 5/4), grayish brown (10YR 5/2), and dark yellowish brown (10YR 4/6) silty clay; moderate medium structure and coarse subangular blocky; plastic, firm; few fine, medium, and large roots; common fine root pores; thick clay films on faces of peds; common medium black concretions; few chert and limestone fragments; medium acid; gradual wavy boundary.

B22t—23 to 55 inches; mottled yellowish brown (10YR 5/6), yellowish brown (10YR 5/4), gray (10YR 6/1), and brown (10YR 5/3) clay; weak coarse angular blocky structure; vertically oriented cracks surrounding polyhedral columns, 3 to 10 inches in diameter; common slickensides oriented 45 degrees from horizontal; plastic, very firm; few fine, medium, and large roots; few fine root pores; common medium black concretions; few chert and limestone fragments; strongly acid; abrupt irregular boundary.

R—55 inches; hard limestone bedrock.

Solum thickness and depth to hard bedrock are 40 to 72 inches. Reaction ranges from strongly acid to medium acid in the A and B1 horizon. Reaction in the B2t horizon is strongly acid to moderately alkaline. The B2t horizon cracks when dry, but the cracks generally do not extend to the surface. Black or brown concretions range from few to many in all horizons. In most pedons, there are a few fragments of chert and limestone.

The A1 or Ap horizon is 4 to 9 inches thick. This horizon has hue of 7.5YR through 2.5Y, value of 3 or 4, and chroma of 2 through 4. Texture is silt loam or silty clay loam. The A horizon is mottled in some pedons.

If present, the B1 horizon is silty clay loam and is 4 to 8 inches thick.

The B2t horizon is generally mottled. It has hue of 10YR through 2.5Y, value of 5 or 6, and chroma of 2 through 6. Texture is clay or silty clay.

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glossary

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15.2 to 38.1 centimeters (6 to 15 inches) long.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms

are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 draw bar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are

almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands which provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand,

loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded 1951-78 at Birmingham, Ala.]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	52.9	33.0	43.0	74	8	72	5.16	3.23	6.88	8	0.4
February---	57.6	35.4	46.5	78	13	97	4.80	2.34	6.92	7	0.3
March------	65.2	42.1	53.7	85	21	194	6.33	3.73	8.64	9	0.0
April------	75.3	50.4	62.9	88	31	387	4.54	2.60	6.25	7	0.0
May--------	81.7	58.2	70.0	93	38	620	4.35	2.11	6.28	7	0.0
June-------	88.0	65.9	77.0	99	50	810	3.71	1.79	5.37	6	0.0
July-------	90.2	69.6	79.9	100	58	927	5.34	3.19	7.26	9	0.0
August-----	89.6	69.1	79.4	97	57	911	3.94	1.87	5.72	7	0.0
September--	84.6	63.5	74.1	97	45	723	4.09	1.81	6.09	6	0.0
October----	74.8	50.4	62.6	89	30	395	2.64	.85	4.09	4	0.0
November---	63.7	40.5	52.1	81	20	126	3.59	2.41	4.67	7	0.0
December---	55.9	35.4	45.6	76	13	65	5.21	2.66	7.43	8	0.4
Yearly:											
Average--	73.3	51.1	62.2	---	---	---	---	---	---	---	---
Extreme--	---	---	---	101	6	---	---	---	---	---	---
Total----	---	---	---	---	---	5,327	53.70	46.07	61.03	85	1.1

[1] A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded 1951-78 at Birmingham, Ala.]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 22	April 6	April 15
2 years in 10 later than--	March 13	March 29	April 10
5 years in 10 later than--	February 24	March 13	March 31
First freezing temperature in fall:			
1 year in 10 earlier than--	November 8	October 28	October 24
2 years in 10 earlier than--	November 15	November 2	October 28
5 years in 10 earlier than--	November 28	November 12	November 4

TABLE 3.--GROWING SEASON

[Recorded 1951-78 at Birmingham, Ala.]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	237	212	200
8 years in 10	251	223	206
5 years in 10	276	243	217
2 years in 10	302	264	228
1 year in 10	316	275	234

TABLE 4.--SUITABILITY OF GENERAL SOIL MAP UNITS, BY SOIL GROUPS, FOR SELECTED USES

[This information is for general planning and does not apply to areas of less than 1,000

Selected use	Undulating to hilly soils on plateaus, mountains, and ridges--units 1, 2, 3, and 4	Undulating to rolling soils in valleys--units 5, 6, and 7	Steep soils on mountains, dissected plateaus, and valley sides--units 8, 9, 10, and 11	
Cultivated crops	Areas in map units 1 and 3 are suited; medium yield potential; many areas limited by slope, degree of erosion, coarse fragments on surface, shallow depth to bedrock, or urban land uses; more than half of prime farmland is in this group.	Areas in map units 5 and 6 are suited; medium yield potential; many areas limited by slope, wetness, or urban land uses; about one-third of prime farmland is in this group.	Most areas unsuited; limited by steep slopes.	M
Pasture and hay	Most areas suited; moderately high yield potential; some areas limited by slope, coarse fragments on surface, shallow depth to rock, or urban land uses; livestock water is inadequate in some areas.	Most areas suited; moderately high yield potential; some areas limited by slope, wetness, or urban land uses.	Small areas suited; most areas unsuited because of steep slopes.	M
Timber crops	Mostly suited to pines and hardwoods; some soils best suited to pines; moderate to high yield potential.	Suited to pines and hardwoods; moderately high to high yield potential.	Some soils suited to pines and hardwoods; others best suited to pines; moderate to moderately high yield potential; planting and harvesting limited by steep slopes.	W
Community and industrial uses.	Mostly suited; limited by slope; slow permeability, or chert fragments; Gorgas soils limited by shallow depth to bedrock.	Most soils are suited; some soils limited by wetness, flooding, or permeability.	Most areas not suited; limited by steep slopes; some soils by fragments, lateral water movement, or shallow depth to bedrock.	M
Major roads, utility lines, and pipelines.	Suited; Gorgas soils limited by shallow depth to rock; moderate restriction to right-of-way maintenance.	Suited; Tupelo soils limited by clayey texture; moderate restrictions to right-of-way maintenance.	Poorly suited; steep slopes and shallow depth to rock; severe hazard of erosion; severe restrictions to right-of-way maintenance.	P
Resource materials	Map unit 1 - coal, fire clay; unit 2 - chert, roadfill; unit 3 - roadfill, stone; unit 4 - stone.	Map units 5 and 6 - roadfill; unit 7 - clay, limestone.	Map unit 8 - chert, roadfill; unit 9 - coal, fire clay; unit 10 - chert, iron ore, limestone, stone; unit 11 - roadfill, stone.	T

TABLE 4.--SUITABILITY OF GENERAL SOIL MAP UNITS, BY SOIL GROUPS, FOR SELECTED USES--Cont

Selected use	Undulating to hilly soils on plateaus, mountains, and ridges--units 1, 2, 3, and 4	Undulating to rolling soils in valleys--units 5, 6, and 7	Steep soils on mountains, dissected plateaus, and valley sides--units 8, 9, 10, and 11
Recreation----------------	Suited to medium and low traffic uses; moderate erosion hazard for high traffic uses; aesthetic appeal of some areas of Gorgas soils.	Suited to medium and low traffic uses; moderate erosion hazard for high traffic uses; some soils limited by wetness.	Suited to low traffic uses; severe hazard of erosion for high traffic uses; aesthetic appeal; rock exposures; native flora.
Watershed----------------	Medium runoff rates; affected by urban uses; moderate infiltration and permeability; moderate hazard of erosion.	Medium runoff rates; affected by urban uses; map unit 7 has slow infiltration and permeability; others moderate; moderate hazard of erosion.	High runoff rates; moderate infiltration and permeability rates; severe hazard of erosion.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
2	Albertville silt loam, 2 to 6 percent slopes	1,500	0.2
3	Allen fine sandy loam, 2 to 6 percent slopes	1,920	0.3
4	Allen fine sandy loam, 8 to 15 percent slopes	4,530	0.6
5	Allen-Urban land complex, 8 to 15 percent slopes	1,510	0.2
6	Barfield-Rock outcrop complex, steep	2,540	0.4
7	Bodine-Fullerton-Urban land complex, steep	7,520	1.1
8	Bodine-Birmingham association, steep	25,560	3.6
9	Bodine-Fullerton association, steep	20,720	2.9
10	Decatur silt loam, 2 to 8 percent slopes	2,320	0.3
11	Decatur silt loam, 8 to 15 percent slopes	1,080	0.2
12	Decatur-Urban land complex, 2 to 8 percent slopes	8,730	1.2
13	Docena complex, 0 to 4 percent slopes	5,020	0.7
14	Dumps	3,300	0.5
15	Etowah loam, 2 to 8 percent slopes	4,740	0.7
16	Etowah-Rock outcrop complex, 2 to 8 percent slopes	1,220	0.2
17	Fullerton-Bodine complex, 8 to 15 percent slopes	14,900	2.1
18	Fullerton-Urban land complex, 8 to 15 percent slopes	21,990	3.1
19	Gorgas-Rock outcrop complex, 8 to 15 percent slopes	1,450	0.2
20	Gorgas-Rock outcrop complex, steep	11,240	1.6
21	Gorgas-Rock outcrop-Urban land complex, 8 to 15 percent slopes	5,190	0.7
22	Hanceville fine sandy loam, 8 to 15 percent slopes	1,260	0.2
23	Hanceville-Urban land complex, 2 to 8 percent slopes	560	0.1
24	Holston loam, 2 to 8 percent slopes	3,640	0.5
25	Holston-Urban land complex, 2 to 8 percent slopes	4,280	0.6
26	Ketona-Sullivan complex, 0 to 4 percent slopes	610	0.1
27	Leesburg-Rock outcrop complex, steep	15,680	2.2
28	Montevallo-Nauvoo-Urban land complex, steep	6,820	1.0
29	Montevallo-Nauvoo association, steep	260,930	36.3
30	Nauvoo fine sandy loam, 2 to 8 percent slopes	9,360	1.3
31	Nauvoo fine sandy loam, 8 to 15 percent slopes	51,440	7.2
32	Nauvoo-Urban land complex, 2 to 8 percent slopes	8,940	1.3
33	Nauvoo-Urban land complex, 8 to 15 percent slopes	11,610	1.6
34	Nauvoo-Montevallo association, steep	44,010	6.2
35	Palmerdale complex, steep	29,390	4.1
36	Pits	1,510	0.2
37	Sullivan-Ketona complex, 0 to 2 percent slopes	5,560	0.8
38	Sullivan-Ketona-Urban land complex, 0 to 2 percent slopes	3,990	0.6
39	Sullivan-State complex, 0 to 2 percent slopes	19,600	2.7
40	Townley-Nauvoo complex, 8 to 15 percent slopes	25,870	3.6
41	Townley-Urban land complex, 8 to 15 percent slopes	13,080	1.8
42	Tupelo silt loam, 0 to 4 percent slopes	3,860	0.5
43	Tupelo-Urban land complex, 0 to 4 percent slopes	10,040	1.4
44	Urban land	27,080	3.8
	Water	7,500	1.1
	Total	713,600	100.0

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Corn	Soybeans	Tall fescue	Grass hay
	Bu	Bu	AUM*	Ton
2 Albertville	75	30	6.5	4.0
3 Allen	85	35	7.0	4.5
4 Allen	75	30	6.5	4.0
5 Allen-Urban land	---	---	---	---
6 Barfield-Rock outcrop	---	---	---	---
7 Bodine-Fullerton-Urban land	---	---	---	---
8:**				
Bodine	---	---	---	---
Birmingham	---	---	---	---
9:**				
Bodine	---	---	---	---
Fullerton	---	---	---	---
10 Decatur	80	30	8.5	5.0
11 Decatur	70	25	7.5	4.5
12 Decatur-Urban land	---	---	---	---
13 Docena	75	30	6.0	4.0
14.** Dumps	---	---	---	---
15 Etowah	90	35	7.5	4.5
16 Etowah-Rock outcrop	---	---	6.5	---
17 Fullerton-Bodine	---	---	5.5	3.5
18 Fullerton-Urban land	---	---	---	---
19 Gorgas-Rock outcrop	---	---	---	---
20 Gorgas-Rock outcrop	---	---	---	---
21 Gorgas-Rock outcrop-Urban land	---	---	---	---

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Soybeans	Tall fescue	Grass hay
	Bu	Bu	AUM*	Ton
22 Hanceville	70	25	7.0	4.0
23 Hanceville-Urban land	---	---	---	---
24 Holston	90	35	7.5	4.5
25 Holston-Urban land	---	---	---	---
26 Ketona-Sullivan	85	32	6.5	4.0
27** Leesburg-Rock outcrop	---	---	---	---
28 Montevallo-Nauvoo-Urban land	---	---	---	---
29:**				
Montevallo	---	---	---	---
Nauvoo	---	---	5.5	3.5
30 Nauvoo	75	30	7.0	4.5
31 Nauvoo	70	25	6.5	4.0
32 Nauvoo-Urban land	---	---	---	---
33 Nauvoo-Urban land	---	---	---	---
34:**				
Nauvoo	---	---	5.5	3.5
Montevallo	---	---	---	---
35 Palmerdale	---	---	---	---
36.** Pits				
37 Sullivan-Ketona	105	35	7.5	4.5
38 Sullivan-Ketona-Urban land	---	---	---	---
39 Sullivan-State	116	39	9.5	5.5
40 Townley-Nauvoo	60	20	5.0	3.5
41 Townley-Urban land	---	---	---	---

See footnotes at end of table.

TABLE 6.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Corn	Soybeans	Tall fescue	Grass hay
	Bu	Bu	AUM*	Ton
42------------------------ Tupelo	60	35	6.5	4.0
43------------------------ Tupelo-Urban land	---	---	---	---
44.** Urban land				

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available. Site index has been rounded to the nearest 5]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
2 Albertville	3o	Moderate	Moderate	Slight	Slight	Loblolly pine	85	Loblolly pine,
						Shortleaf pine	75	Virginia pine,[1]
						Virginia pine	75	eastern white pine.[1]
3, 4 Allen	3o	Slight	Slight	Slight	Slight	Yellow-poplar	90	Yellow-poplar,
						Shortleaf pine	70	loblolly pine,
						Virginia pine	70	eastern white pine,[1]
						Loblolly pine	80	Virginia pine.[1]
6:[2]								
Barfield	4x	Severe	Severe	Severe	Moderate	Eastern redcedar	40	Eastern redcedar.
Rock outcrop.								
8:[2]								
Bodine	4f	Moderate	Severe	Severe	Slight	Virginia pine	50	Virginia pine,
						Chestnut oak	55	loblolly pine.
						Scarlet oak	55	
						Shortleaf pine	60	
						Loblolly pine	70	
Birmingham	4r	Severe	Moderate	Slight	Slight	Loblolly pine	70	Loblolly pine,
						Shortleaf pine	60	Virginia pine.[1]
						Virginia pine	60	
9:[2]								
Bodine	4f	Moderate	Severe	Severe	Slight	Virginia pine	50	Virginia pine,
						Chestnut oak	55	loblolly pine.
						Scarlet oak	55	
						Shortleaf pine	60	
						Loblolly pine	70	
Fullerton	3o	Slight	Slight	Slight	Slight	Yellow-poplar	90	Yellow-poplar,
						White oak	70	loblolly pine,
						Southern red oak	70	Virginia pine,[1]
						Loblolly pine	80	eastern white pine.[1]
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern redcedar	50	
10, 11 Decatur	3o	Slight	Slight	Slight	Slight	Shortleaf pine	70	Yellow-poplar,
						Yellow-poplar	85	loblolly pine,
						Loblolly pine	80	eastern white pine,[1]
						Virginia pine	70	Virginia pine.[1]
						Eastern white pine	80	
13[2] Docena	2w	Slight	Moderate	Slight	Slight	Sweetgum	90	Sweetgum, loblolly
						Loblolly pine	90	pine, yellow-poplar,
						Shortleaf pine	80	American sycamore.
						Yellow-poplar	100	
						Water oak	90	
15 Etowah	2o	Slight	Slight	Slight	Slight	Yellow-poplar	90	Yellow-poplar, black
						Southern red oak	80	walnut, loblolly
						Loblolly pine	90	pine, Virginia pine,[1]
						Shortleaf pine	80	eastern white pine.[1]
						Black walnut	85	
						Virginia pine	80	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
16:[2]								
Etowah	2x	Slight	Severe	Moderate	Slight	Yellow-poplar	90	Yellow-poplar, black walnut, loblolly pine, Virginia pine,[1] eastern white pine.[1]
						Southern red oak	80	
						Loblolly pine	90	
						Shortleaf pine	80	
						Black walnut	85	
						Virginia pine	80	
Rock outcrop.								
17:[2]								
Fullerton	3o	Slight	Slight	Slight	Slight	Yellow-poplar	90	Shortleaf pine, loblolly pine, Virginia pine,[1] eastern white pine,[1] yellow-poplar.
						White oak	70	
						Southern red oak	70	
						Loblolly pine	80	
						Shortleaf pine	70	
						Virginia pine	70	
						Eastern redcedar	50	
Bodine	4f	Moderate	Severe	Severe	Slight	Virginia pine	50	Virginia pine, loblolly pine.
						Chestnut oak	55	
						Scarlet oak	55	
						Loblolly pine	70	
						Shortleaf pine	60	
19:[2]								
Gorgas	4x	Moderate	Moderate	Moderate	Severe	Shortleaf pine	60	Loblolly pine, Virginia pine.
						Loblolly pine	70	
						Virginia pine	60	
Rock outcrop.								
20:[2]								
Gorgas	4x	Severe	Severe	Severe	Severe	Shortleaf pine	60	Loblolly pine, Virginia pine.
						Loblolly pine	70	
						Virginia pine	60	
Rock outcrop.								
22 Hanceville	4o	Slight	Slight	Slight	Slight	Loblolly pine	75	Loblolly pine, shortleaf pine, yellow-poplar, Virginia pine,[1] eastern white pine.[1]
						Shortleaf pine	65	
						Yellow-poplar	80	
						Virginia pine	70	
24 Holston	3o	Slight	Slight	Slight	Slight	Yellow-poplar	85	Loblolly pine, Virginia pine,[1] yellow-poplar, black walnut, eastern white pine.[1]
						Northern red oak	80	
						Shortleaf pine	70	
						Loblolly pine	85	
						Virginia pine	75	
						Black walnut	80	
26:[2]								
Ketona	3w	Slight	Severe	Severe	Slight	Sweetgum	80	Sweetgum, loblolly pine, water oak.
						Loblolly pine	80	
						Water oak	80	
Sullivan	2w	Slight	Moderate	Slight	Slight	Yellow-poplar	100	Yellow-poplar, loblolly pine, black walnut.
						Northern red oak	70	
						Shortleaf pine	70	
						Loblolly pine	90	

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
27:[2] Leesburg	3r	Severe	Severe	Slight	Slight	Yellow-poplar White oak Shortleaf pine Loblolly pine Virginia pine	85 70 70 80 70	Loblolly pine, yellow-poplar.
Rock outcrop.								
29:[2] Montevallo	4d	Severe	Moderate	Moderate	Moderate	Loblolly pine Shortleaf pine Virginia pine	70 60 60	Loblolly pine, Virginia pine.
Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, Virginia pine,[1] yellow-poplar, sweetgum, eastern white pine.[1]
30, 31 Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, Virginia pine,[1] yellow-poplar, sweetgum, eastern white pine.[1]
34:[2] Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, Virginia pine,[1] yellow-poplar, sweetgum, eastern white pine.[1]
Montevallo	4d	Severe	Moderate	Moderate	Moderate	Loblolly pine Shortleaf pine Virginia pine	70 60 60	Loblolly pine, Virginia pine.
35[2] Palmerdale	3x	Severe	Severe	Severe	Slight	Sweetgum Loblolly pine Virginia pine American sycamore Eastern cottonwood Shortleaf pine Longleaf pine	80 80 70 90 90 70 65	Loblolly pine, Virginia pine, American sycamore, eastern cottonwood, longleaf pine.
37:[2] Sullivan	2w	Slight	Moderate	Slight	Slight	Yellow-poplar Northern red oak Shortleaf pine Loblolly pine	100 70 70 90	Yellow-poplar, black walnut, loblolly pine.
Ketona	3w	Slight	Severe	Moderate	Slight	Sweetgum Loblolly pine Water oak	80 80 80	Sweetgum, loblolly pine, water oak.
39:[2] Sullivan	2w	Slight	Moderate	Slight	Slight	Yellow-poplar Northern red oak Shortleaf pine Loblolly pine	100 70 70 70	Yellow-poplar, black walnut, loblolly pine.
State	2o	Slight	Slight	Slight	Slight	Southern red oak Yellow-poplar Loblolly pine Shortleaf pine	75 95 85 75	Black walnut, yellow-poplar, loblolly pine.

See footnotes at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Windthrow hazard	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
40:[2]								
Townley	4o	Slight	Slight	Slight	Slight	Loblolly pine Virginia pine Shortleaf pine	70 70 60	Loblolly pine, Virginia pine,[1] eastern white pine.[1]
Nauvoo	2o	Slight	Slight	Slight	Slight	Loblolly pine Shortleaf pine Virginia pine Yellow-poplar Sweetgum	89 80 80 100 90	Loblolly pine, Virginia pine,[1] yellow-poplar, sweetgum, eastern white pine.[1]
42 Tupelo	3w	Slight	Moderate	Moderate	Slight	Yellow-poplar Loblolly pine Sweetgum White oak Southern red oak	90 80 80 70 70	Loblolly pine, yellow-poplar, sweetgum.

1 Christmas tree species.
2 See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
2 Albertville	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, percs slowly.	Slight	Slight.
3 Allen	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
4 Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
5:*					
Allen	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Urban land.					
6:*					
Barfield	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope.
Rock outcrop.					
7:*					
Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Fullerton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
Urban land.					
8:*					
Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Birmingham	Severe: slope, small stones.	Severe: slope, small stones.	Severe: large stones, slope, small stones.	Severe: slope, small stones.	Severe: small stones, large stones, slope.
9:*					
Bodine	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Fullerton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Severe: small stones.
10 Decatur	Slight	Slight	Moderate: slope.	Slight	Slight.
11 Decatur	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12:*					
Decatur	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.					
13* Docena	Moderate: wetness.	Moderate: wetness.	Moderate: slope, wetness.	Moderate: wetness.	Moderate: wetness.
14.* Dumps					
15 Etowah	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.	Slight.
16:*					
Etowah	Slight	Slight	Moderate: slope, small stones.	Severe: erodes easily.	Slight.
Rock outcrop.					
17:*					
Fullerton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
Bodine	Severe: small stones.	Severe: small stones.	Severe: slope, small stones.	Severe: small stones.	Severe: small stones.
18:*					
Fullerton	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: small stones.	Severe: small stones.
Urban land.					
19:*					
Gorgas	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: thin layer.
Rock outcrop.					
20:*					
Gorgas	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, thin layer.
Rock outcrop.					
21:*					
Gorgas	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: thin layer.
Rock outcrop.					
Urban land.					
22 Hanceville	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
23:*					
Hanceville	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
24-------------------- Holston	Slight----------	Slight----------	Moderate: slope, small stones.	Slight------------	Slight.
25:*					
Holston--------------	Slight----------	Slight----------	Moderate: slope.	Slight------------	Slight.
Urban land.					
26:*					
Ketona---------------	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
Sullivan-------------	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
27:*					
Leesburg-------------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
28:*					
Montevallo-----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, erodes easily.	Severe: droughty, slope, thin layer.
Nauvoo---------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Urban land.					
29:*					
Montevallo-----------	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, erodes easily.	Severe: droughty, slope, thin layer.
Nauvoo---------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
30-------------------- Nauvoo	Slight----------	Slight----------	Moderate: slope, small stones.	Slight------------	Slight.
31-------------------- Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
32:*					
Nauvoo---------------	Slight----------	Slight----------	Moderate: slope, small stones.	Slight------------	Slight.
Urban land.					
33:*					
Nauvoo---------------	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight------------	Moderate: slope.
Urban land.					
34:*					
Nauvoo---------------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
34:*					
Montevallo	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, erodes easily.	Severe: droughty, slope, thin layer.
35* Palmerdale	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
36.* Pits					
37:*					
Sullivan	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
Ketona	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
38:*					
Sullivan	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Severe: floods.
Ketona	Severe: floods, wetness.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.
Urban land.					
39:*					
Sullivan	Severe: floods.	Moderate: floods.	Severe: floods.	Moderate: floods.	Moderate: floods.
State	Severe: floods.	Slight	Moderate: floods.	Slight	Moderate: floods.
40:*					
Townley	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, slope, thin layer.
Nauvoo	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
41:*					
Townley	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Severe: erodes easily.	Moderate: small stones, slope, thin layer.
Urban land.					
42 Tupelo	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
43:*					
Tupelo	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Severe: erodes easily.	Moderate: wetness.
Urban land.					
44.* Urban land					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
2 Albertville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
3 Allen	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
4 Allen	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
5:*										
Allen.										
Urban land.										
6:*										
Barfield	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
Rock outcrop.										
7:*										
Bodine.										
Fullerton.										
Urban land.										
8:*										
Bodine	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Birmingham	Very poor.	Fair	Good	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
9:*										
Bodine	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Poor	Very poor.
Fullerton	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
10, 11 Decatur	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
12:*										
Decatur.										
Urban land.										
13* Docena	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
14.* Dumps										
15 Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
16:*										
Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Rock outcrop.										
17:*										
Fullerton	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Bodine	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
18:*										
Fullerton.										
Urban land.										
19,* 20:*										
Gorgas	Very poor.	Poor	Poor	Poor	Very poor.	Very poor.	Very poor.	Poor	Poor	Very poor.
Rock outcrop.										
21:*										
Gorgas.										
Rock outcrop.										
Urban land.										
22 Hanceville	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
23:*										
Hanceville.										
Urban land.										
24 Holston	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
25:*										
Holston.										
Urban land.										
26:*										
Ketona	Poor	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Sullivan	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
27:*										
Leesburg	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Rock outcrop.										
28:*										
Montevallo.										
Nauvoo.										

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
28:* Urban land.										
29:* Montevallo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
30 Nauvoo	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
31 Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
32:* Nauvoo.										
Urban land.										
33:* Nauvoo.										
Urban land.										
34:* Nauvoo	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Montevallo	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
35* Palmerdale	Very poor.	Poor	Poor	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
36.* Pits										
37:* Sullivan	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
Ketona	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
38:* Sullivan.										
Ketona.										
Urban land.										
39:* Sullivan	Poor	Fair	Fair	Good	Good	Poor	Very poor.	Fair	Good	Very poor.
State	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
40:* Townley	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

TABLE 9.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
40:*										
Nauvoo	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
41:*										
Townley.										
Urban land.										
42 Tupelo	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
43:*										
Tupelo.										
Urban land.										
44.* Urban land										

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
2 Albertville	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
3 Allen	Moderate: too clayey.	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
4 Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
5:*						
Allen	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Urban land.						
6:*						
Barfield	Severe: depth to rock, slope.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, slope, shrink-swell.	Severe: shrink-swell, slope, depth to rock.	Severe: depth to rock, low strength, slope.	Severe: slope, thin layer.
Rock outcrop.						
7:*						
Bodine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Fullerton	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, slope.	Severe: slope.	Moderate: low strength, slope.	Severe: small stones.
Urban land.						
8:*						
Bodine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Birmingham	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, large stones, slope.
9:*						
Bodine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Fullerton	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Severe: small stones.
10 Decatur	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
11 Decatur	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12:*						
Decatur----------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Moderate: low strength.	Slight.
Urban land.						
13*---------------- Docena	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
14.* Dumps						
15---------------- Etowah	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
16:*						
Etowah-----------	Moderate: too clayey.	Slight---------	Slight---------	Moderate: slope.	Moderate: low strength.	Slight.
Rock outcrop.						
17:*						
Fullerton--------	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Severe: small stones.
Bodine-----------	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, large stones.	Severe: small stones.
18:*						
Fullerton--------	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Severe: small stones.
Urban land.						
19:*						
Gorgas-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
20:*						
Gorgas-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
Rock outcrop.						
21:*						
Gorgas-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: thin layer.
Rock outcrop.						
Urban land.						
22---------------- Hanceville	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
23:*						
Hanceville-------	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Urban land.						

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
24 Holston	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
25:*						
Holston	Slight	Slight	Slight	Moderate: slope.	Slight	Slight.
Urban land.						
26:*						
Ketona	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
Sullivan	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
27:*						
Leesburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
28:*						
Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, thin layer.
Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Urban land.						
29:*						
Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, thin layer.
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
30 Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
31 Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
32:*						
Nauvoo	Slight	Slight	Slight	Moderate: slope.	Moderate: low strength.	Slight.
Urban land.						
33:*						
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Urban land.						
34:*						
Nauvoo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
34:*						
Montevallo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope, thin layer.
35* Palmerdale	Severe: slope.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: slope, unstable fill.	Severe: small stones, droughty, slope.
36.* Pits						
37:*						
Sullivan	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Ketona	Severe: wetness.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, floods.
38:*						
Sullivan	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Ketona	Severe: wetness.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: shrink-swell, low strength, wetness.	Severe: wetness, floods.
Urban land.						
39:*						
Sullivan	Moderate: floods, wetness.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
State	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
40:*						
Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope, thin layer.
Nauvoo	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
41:*						
Townley	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, shrink-swell, slope.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope, thin layer.
Urban land.						
42 Tupelo	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
43:*						
Tupelo	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
43:*						
Urban land.						
44.*						
Urban land						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
2----------------- Albertville	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
3----------------- Allen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
4----------------- Allen	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
5:*					
Allen-------------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Urban land.					
6:*					
Barfield----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, thin layer, slope.
Rock outcrop.					
7:*					
Bodine------------	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Fullerton---------	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: small stones, slope, too clayey.
Urban land.					
8:*					
Bodine------------	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Birmingham--------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, large stones, slope.
9:*					
Bodine------------	Severe: slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Fullerton---------	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: slope, too clayey.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
10 Decatur	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
11 Decatur	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, hard to pack, slope.
12:*					
Decatur	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, hard to pack.
Urban land.					
13* Docena	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
14.* Dumps					
15 Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
16:*					
Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Rock outcrop.					
17:*					
Fullerton	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: small stones, slope, too clayey.
Bodine	Moderate: slope, large stones.	Severe: seepage, slope, large stones.	Severe: seepage, large stones.	Severe: seepage.	Poor: small stones.
18:*					
Fullerton	Moderate: slope, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Fair: small stones, slope, too clayey.
Urban land.					
19:*					
Gorgas	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
20:*					
Gorgas	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: area reclaim, thin layer, slope.
Rock outcrop.					

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21:*					
Gorgas	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: area reclaim, thin layer.
Rock outcrop.					
Urban land.					
22 Hanceville	Moderate: slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
23:*					
Hanceville	Slight	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Urban land.					
24 Holston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
25:*					
Holston	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Urban land.					
26:*					
Ketona	Severe: ponding, percs slowly.	Severe: ponding.	Severe: depth to rock, ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
Sullivan	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Good.
27:*					
Leesburg	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
28:*					
Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, thin layer.
Nauvoo	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Urban land.					
29:*					
Montevallo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, thin layer.
Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30----------------- Nauvoo	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight-----------	Fair: area reclaim.
31----------------- Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.
32:*					
Nauvoo-------------	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Slight-----------	Fair: area reclaim.
Urban land.					
33:*					
Nauvoo-------------	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.
Urban land.					
34:*					
Nauvoo-------------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Montevallo---------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, thin layer.
35*----------------- Palmerdale	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: small stones, slope.
36.* Pits					
37:*					
Sullivan-----------	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Good.
Ketona-------------	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, depth to rock, wetness.	Severe: floods, wetness.	Poor: too clayey, hard to pack, wetness.
38:*					
Sullivan-----------	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Good.
Ketona-------------	Severe: floods, wetness, percs slowly.	Severe: floods, wetness.	Severe: floods, depth to rock, wetness.	Severe: floods, wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.					
39:*					
Sullivan-----------	Severe: floods.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Good.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
39:*					
State	Severe: floods.	Severe: seepage, floods.	Severe: floods, seepage, wetness.	Severe: floods, seepage.	Good.
40:*					
Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, thin layer.
Nauvoo	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: area reclaim, slope.
41:*					
Townley	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, thin layer.
Urban land.					
42 Tupelo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
43:*					
Tupelo	Severe: wetness, percs slowly.	Severe: wetness.	Severe: depth to rock, wetness.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
Urban land.					
44.* Urban land					

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Roadfill	Topsoil
2: Albertville	Poor: low strength.	Poor: thin layer.
3, 4: Allen	Fair: low strength.	Fair: small stones.
5:*		
Allen.		
Urban land.		
6:*		
Barfield	Poor: area reclaim, low strength, shrink-swell.	Poor: area reclaim, large stones, thin layer.
Rock outcrop.		
7:*		
Bodine.		
Fullerton.		
Urban land.		
8:*		
Bodine	Fair: slope, large stones.	Poor: small stones, area reclaim, slope.
Birmingham	Poor: thin layer, slope.	Poor: large stones, area reclaim, slope.
9:*		
Bodine	Fair: slope, large stones.	Poor: small stones, area reclaim, slope.
Fullerton	Poor: low strength.	Poor: too clayey, small stones.
10, 11: Decatur	Fair: low strength.	Poor: too clayey.
12:*		
Decatur.		
Urban land.		
13*: Docena	Poor: low strength.	Fair: too clayey.
14.*		
Dumps		
15: Etowah	Fair: low strength, thin layer.	Fair: small stones.
16:*		
Etowah	Fair: low strength, thin layer.	Fair: small stones.
Rock outcrop.		
17:*		
Fullerton	Poor: low strength.	Poor: too clayey, small stones.
Bodine	Fair: large stones.	Poor: small stones, area reclaim.
18:*		
Fullerton.		
Urban land.		
19:*		
Gorgas	Poor: area reclaim, thin layer.	Poor: area reclaim, small stones, thin layer.
Rock outcrop.		
20:*		
Gorgas	Poor: area reclaim, slope, thin layer.	Poor: area reclaim, small stones, slope, thin layer.
Rock outcrop.		
21:*		
Gorgas.		
Rock outcrop.		
Urban land.		
22: Hanceville	Poor: low strength.	Fair: too clayey.
23:*		
Hanceville.		
Urban land.		
24: Holston	Good	Fair: too clayey, small stones, area reclaim.

See footnote at end of table.

TABLE 12.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Topsoil
25:*		
Holston.		
Urban land.		
26:*		
Ketona	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
Sullivan	Fair: low strength.	Fair: small stones.
27:*		
Leesburg	Poor: slope.	Poor: small stones, area reclaim, slope.
Rock outcrop.		
28:*		
Montevallo.		
Nauvoo.		
Urban land.		
29:*		
Montevallo	Poor: area reclaim, thin layer, slope.	Poor: area reclaim, small stones, thin layer.
Nauvoo	Fair: area reclaim, thin layer.	Fair: small stones, slope.
30 Nauvoo	Fair: area reclaim, thin layer.	Fair: small stones.
31 Nauvoo	Fair: area reclaim, thin layer.	Fair: small stones, slope.
32:*		
Nauvoo.		
Urban land.		
33:*		
Nauvoo.		
Urban land.		
34:*		
Nauvoo	Fair: area reclaim, thin layer, slope.	Poor: slope.
Montevallo	Poor: area reclaim, thin layer, slope.	Poor: area reclaim, small stones, thin layer.
35* Palmerdale	Poor: slope.	Poor: small stones, area reclaim, slope.
36.*		
Pits		
37:*		
Sullivan	Fair: low strength.	Fair: small stones.
Ketona	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
38:*		
Sullivan.		
Ketona.		
Urban land.		
39:*		
Sullivan	Fair: low strength.	Fair: small stones.
State	Good	Good.
40:*		
Townley	Poor: area reclaim, low strength.	Poor: too clayey, thin layer.
Nauvoo	Fair: area reclaim, thin layer.	Fair: small stones, slope.
41:*		
Townley.		
Urban land.		
42 Tupelo	Poor: low strength, shrink-swell.	Poor: thin layer.
43:*		
Tupelo.		
Urban land.		
44.*		
Urban land.		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
2 Albertville	Moderate: depth to rock, slope.	Moderate: thin layer, piping, hard to pack.	Deep to water	Slope, erodes easily.	Favorable	Favorable.
3 Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Favorable	Favorable.
4 Allen	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
5:*						
Allen.						
Urban land.						
6:*						
Barfield	Severe: depth to rock, slope.	Severe: thin layer, hard to pack.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
7:*						
Bodine.						
Fullerton.						
Urban land.						
8:*						
Bodine	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Birmingham	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, depth to rock, slope.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
9:*						
Bodine	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Fullerton	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
10 Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
11 Decatur	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
12:*						
Decatur.						
Urban land.						
13* Docena	Moderate: seepage.	Severe: piping.	Favorable	Wetness, percs slowly.	Wetness	Favorable.
14.*						
Dumps						

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
15-----------------Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
16:*						
Etowah-----------	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
Rock outcrop.						
17:*						
Fullerton--------	Moderate: seepage.	Severe: hard to pack.	Deep to water	Slope, slow intake.	Slope----------	Slope.
Bodine-----------	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
18:*						
Fullerton.						
Urban land.						
19:*						
Gorgas-----------	Severe: seepage, depth to rock.	Severe: thin layer, piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
20:*						
Gorgas-----------	Severe: seepage, depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop.						
21:*						
Gorgas.						
Rock outcrop.						
Urban land.						
22-----------------Hanceville	Moderate: seepage.	Slight---------	Deep to water	Slope----------	Slope----------	Slope.
23:*						
Hanceville.						
Urban land.						
24-----------------Holston	Moderate: seepage.	Severe: piping.	Deep to water	Slope----------	Favorable------	Favorable.
25:*						
Holston.						
Urban land.						
26:*						
Ketona-----------	Moderate: depth to rock.	Severe: hard to pack, ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
Sullivan---------	Moderate: seepage.	Severe: piping.	Deep to water	Floods---------	Favorable------	Favorable.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
27:*						
Leesburg	Severe: slope.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
Rock outcrop.						
28:*						
Montevallo.						
Nauvoo.						
Urban land.						
29:*						
Montevallo	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
30 Nauvoo	Moderate: seepage, depth to rock.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
31 Nauvoo	Moderate: seepage, depth to rock, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
32:*						
Nauvoo.						
Urban land.						
33:*						
Nauvoo.						
Urban land.						
34:*						
Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Montevallo	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Droughty, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, droughty.
35*						
Palmerdale	Severe: seepage, slope.	Severe: seepage.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
36.*						
Pits						
37:*						
Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Floods	Favorable	Favorable.
Ketona	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly, floods.	Wetness, percs slowly, floods.	Wetness, percs slowly.	Wetness, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
38:*						
Sullivan.						
Ketona.						
Urban land.						
39:*						
Sullivan	Moderate: seepage.	Severe: piping.	Deep to water	Floods	Favorable	Favorable.
State	Severe: seepage.	Moderate: piping.	Deep to water	Favorable	Favorable	Favorable.
40:*						
Townley	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Nauvoo	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
41:*						
Townley.						
Urban land.						
42 Tupelo	Moderate: depth to rock.	Severe: hard to pack, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
43:*						
Tupelo.						
Urban land.						
44.* Urban land						

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
2----------------- Albertville	0-7	Silt loam--------	CL-ML, ML	A-4	0	95-100	80-96	75-94	50-85	<30	NP-7
	7-59	Silty clay loam, silty clay, clay.	CL, CH, MH	A-6, A-7	0	95-100	80-100	75-100	70-99	35-70	14-40
	59-72	Weathered bedrock	---	---	---	---	---	---	---	---	---
3----------------- Allen	0-7	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-7
	7-80	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	50-80	22-43	5-19
4----------------- Allen	0-9	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-7
	9-80	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	50-80	22-43	5-19
5:* Allen-----------	0-7	Fine sandy loam	ML, CL-ML, SM, SM-SC	A-4	0-5	90-100	75-100	65-98	40-80	<26	NP-7
	7-80	Clay loam, sandy clay loam, loam.	CL-ML, CL	A-4, A-6, A-7-6	0-10	85-100	75-100	65-98	50-80	22-43	5-19
Urban land.											
6:* Barfield---------	0-4	Stony silty clay loam.	CL, CH, MH	A-6, A-7	10-25	90-100	85-95	80-90	75-85	35-65	12-35
	4-11	Stony silty clay loam, stony silty clay.	CL, CH, MH	A-7	10-25	70-100	65-90	60-85	55-80	40-70	22-40
Rock outcrop.	11	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
7:* Bodine----------	0-4	Cherty silt loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	5-25	30-90	20-75	20-67	20-62	<30	NP-7
	4-72	Very cherty loam, very cherty clay loam, very cherty silty clay loam.	GC, GM, SC, SM	A-2	20-55	20-70	15-65	15-45	12-35	26-42	8-16
Fullerton-------	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	50-88	40-80	30-70	16-30	3-10
	6-35	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-6, A-7	2-18	60-90	50-85	40-75	30-70	29-42	11-17
	35-65	Cherty clay, cherty silty clay.	MH, ML, GC, SC	A-2, A-7	2-18	60-90	50-85	40-75	30-75	48-78	20-42
Urban land.											
8:* Bodine----------	0-4	Cherty silt loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	5-25	30-90	20-75	20-67	20-62	<30	NP-7
	4-72	Very cherty loam, very cherty clay loam, very cherty silty clay loam.	GC, GM, SC, SM	A-2	20-55	20-70	15-65	15-45	12-35	26-42	8-16

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
8:* Birmingham-------	0-5	Cobbly loam-------	GM-GC, GM, SM-SC, SM	A-2, A-4	25-50	44-75	39-70	30-65	25-50	<20	NP-7
	5-29	Cobbly loam, cobbly clay loam.	SC, SM-SC, GC, GM-GC	A-4, A-2, A-6	25-50	65-85	60-80	55-75	30-50	21-33	4-16
	29-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
	49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
9:* Bodine-----------	0-4	Cherty silt loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	5-25	30-90	20-75	20-67	20-62	<30	NP-7
	4-72	Very cherty loam, very cherty clay loam, very cherty silty clay loam.	GC, GM, SC, SM	A-2	20-55	20-70	15-65	15-45	12-35	26-42	8-16
Fullerton--------	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	50-88	40-80	30-70	16-30	3-10
	6-35	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-6, A-7	2-18	60-90	50-85	40-75	30-70	29-42	11-17
	35-65	Cherty clay, cherty silty clay.	MH, ML, GC, SC	A-2, A-7	2-18	60-90	50-85	40-75	30-75	48-78	20-42
10, 11----------- Decatur	0-7	Silt loam---------	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	20-32	NP-12
	7-72	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6	0-3	90-100	90-100	88-99	78-92	30-49	8-22
12:* Decatur----------	0-7	Silt loam---------	CL, ML, CL-ML	A-4, A-6	0-3	90-100	90-98	85-98	65-80	20-32	NP-12
	7-72	Silty clay loam, silty clay, clay.	ML, CL	A-7, A-4, A-6	0-3	90-100	90-100	88-99	78-92	30-49	8-22
Urban land.											
13*-------------- Docena	0-4	Silt loam---------	ML, SM	A-4	0	90-100	80-100	70-100	45-80	<30	NP-7
	4-40	Silt loam, silty clay loam.	ML, CL	A-4, A-6, A-7	0	98-100	95-100	90-100	80-100	28-42	5-16
	40-58	Silt loam, silty clay loam, loam.	ML, CL, MH	A-4, A-6, A-7	0	98-100	95-100	90-100	70-100	30-55	6-25
	58-65	Variable----------	---	---	---	---	---	---	---	---	---
14.* Dumps											
15--------------- Etowah	0-6	Loam--------------	ML, CL, SM-SC, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	6-65	Silty clay loam, clay loam.	CL	A-4, A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
16:* Etowah----------	0-6	Loam--------------	ML, CL, SM-SC, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	6-65	Silty clay loam, clay loam.	CL	A-4, A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
Rock outcrop.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
17:* Fullerton	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	50-88	40-80	30-70	16-30	3-10
	6-35	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-6, A-7	2-18	60-90	50-85	40-75	30-70	29-42	11-17
	35-65	Cherty clay, cherty silty clay.	MH, ML, GC, SC	A-2, A-7	2-18	60-90	50-85	40-75	30-75	48-78	20-42
Bodine	0-4	Cherty silt loam	ML, CL-ML, GM, SM	A-4, A-2, A-1-B	5-25	30-90	20-75	20-67	20-62	<30	NP-7
	4-72	Very cherty loam, very cherty clay loam, very cherty silty clay loam.	GC, GM, SC, SM	A-2	20-55	20-70	15-65	15-45	12-35	26-42	8-16
18:* Fullerton	0-6	Cherty silt loam	ML, CL-ML, CL, GM	A-2, A-4	2-15	60-94	50-88	40-80	30-70	16-30	3-10
	6-35	Cherty silty clay loam, cherty silt loam.	CL, GC, SC, ML	A-2, A-6, A-7	2-18	60-90	50-85	40-75	30-70	29-42	11-17
	35-65	Cherty clay, cherty silty clay.	MH, ML, GC, SC	A-2, A-7	2-18	60-90	50-85	40-75	30-75	48-78	20-42
Urban land.											
19,* 20:* Hector	0-4	Sandy loam	SM, ML, SM-SC	A-2, A-4	0	80-100	80-100	80-100	30-65	<30	NP-7
	4-15	Sandy loam, gravelly sandy loam, loam.	SM, ML, GM, GM-GC	A-4, A-2	0-15	55-100	55-100	45-100	30-65	<30	NP-7
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
21:* Gorgas	0-4	Sandy loam	SM, ML, SM-SC	A-2, A-4	0	80-100	80-100	80-100	30-65	<30	NP-7
	4-15	Sandy loam, gravelly sandy loam, loam.	SM, ML, GM, GM-GC	A-4, A-2	0-15	55-100	55-100	45-100	30-65	<30	NP-7
	15	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
Urban land.											
22 Hanceville	0-9	Fine sandy loam	ML, CL, CL-ML	A-4	0	95-100	90-100	80-98	50-80	<25	NP-10
	9-70	Clay loam, clay	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	70-90	30-50	11-25
23:* Hanceville	0-9	Fine sandy loam	ML, CL, CL-ML	A-4, A-6	0	95-100	90-100	80-98	50-80	<25	NP-10
	9-80	Clay loam, clay	ML, CL	A-4, A-6, A-7	0	95-100	95-100	90-100	70-90	30-50	11-25
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
24---------------- Holston	0-6	Loam-------------	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	6-65	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	50-100	30-80	21-35	3-10
25:* Holston---------	0-6	Loam-------------	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	65-100	30-75	<22	NP-6
	6-65	Loam, clay loam, sandy clay loam.	ML, CL-ML, SM, SM-SC	A-4, A-2	0-5	80-100	75-100	50-100	30-80	21-35	3-10
Urban land.											
26:* Ketona----------	0-6	Silt loam--------	ML, MH	A-6, A-7	0	100	95-100	90-100	70-100	38-60	10-24
	6-50	Silty clay, clay	CL, CH	A-7	0	92-100	91-100	85-100	75-100	40-60	16-34
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sullivan--------	0-24	Silt loam--------	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
	24-60	Silty clay, clay loam, silty clay loam.	CL, CH	A-6, A-7	0	75-100	60-100	85-100	60-95	30-50	15-30
27:* Leesburg--------	0-4	Cobbly sandy loam	SM, SM-SC, ML, CL-ML	A-2, A-4	10-25	85-95	80-90	45-70	25-55	<25	NP-7
	4-40	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	SM, ML, CL-ML, CL	A-4	0-15	65-85	55-80	45-70	40-60	<30	NP-10
	40-66	Gravelly clay loam, silty clay loam, sandy clay loam.	SC, CL	A-4, A-6	0-20	75-90	70-85	55-75	40-65	26-40	8-20
Rock outcrop.											
28:* Montevallo------	0-6	Shaly silt loam	SM-SC, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	6-16	Shaly silt loam, shaly loam, shaly silty clay loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	16-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nauvoo----------	0-12	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
29:* Montevallo------	0-6	Shaly silt loam	SM-SC, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	6-16	Shaly silt loam, shaly loam, shaly silty clay loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	16-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nauvoo----------	0-12	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
30, 31----------- Nauvoo	0-12	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
32,* 33:* Nauvoo----------	0-12	Fine sandy loam	SM, ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											
34:* Nauvoo----------	0-12	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Montevallo------	0-6	Shaly silt loam	SM-SC, SC, CL-ML, CL	A-4	0-5	60-88	50-75	45-70	40-65	<30	NP-10
	6-16	Shaly silt loam, shaly loam, shaly silty clay loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	0-5	35-70	23-50	15-45	15-40	20-40	2-15
	16-36	Weathered bedrock	---	---	---	---	---	---	---	---	---
35*-------------- Palmerdale	0-6	Very shaly silt loam.	GM, SC, GC, SM	A-2, A-4, A-6, A-1	15-30	40-85	15-75	10-60	9-40	25-40	3-16
	6-60	Very shaly silt loam, very shaly loam, shaly silty clay loam.	GC, SM, GM, SC	A-2, A-4, A-6, A-1	15-30	40-85	15-75	10-60	9-40	25-40	3-16

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
36.* Pits											
37:*											
Sullivan	0-25	Silt loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
	25-60	Silty clay loam, clay loam, silty clay.	CL, ML	A-6, A-7	0	75-100	80-100	85-100	60-95	30-50	15-30
Ketona	0-6	Silty clay loam	ML, MH	A-7, A-6	0	100	95-100	90-100	70-100	38-60	10-24
	6-50	Silty clay, clay	CL, CH	A-7	0	92-100	91-100	85-100	75-100	40-60	22-34
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
38:*											
Sullivan	0-25	Silt loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
	25-60	Silty clay loam, silty clay, clay loam.	CL, ML	A-6, A-7	0	75-100	80-100	85-100	60-95	30-50	15-30
Ketona	0-6	Silty clay loam	ML, MH	A-7, A-6	0	100	95-100	90-100	70-100	38-60	10-24
	6-50	Silty clay, clay	CL, CH	A-7	0	92-100	91-100	85-100	75-100	40-60	22-34
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
39:*											
Sullivan	0-39	Silt loam	ML, CL, CL-ML, SM	A-4	0	80-100	75-100	60-100	36-90	20-31	3-10
	39-66	Gravelly fine sandy loam, gravelly loam, silt loam, sandy loam.	SM, SM-SC, SC, GM	A-4, A-2	0-5	65-100	55-100	45-85	25-55	20-30	3-10
State	0-9	Silt loam	SM, ML, CL-ML, SM-SC	A-4	0	95-100	95-100	65-100	40-85	<35	NP-7
	9-40	Loam, clay loam, sandy clay loam.	CL, SC	A-4, A-6	0	95-100	95-100	75-100	35-80	24-40	8-25
	40-60	Stratified sand to fine sandy loam.	SM, SM-SC, SP-SM	A-2, A-3, A-4	0	85-100	75-100	40-90	5-50	<25	NP-7
40:*											
Townley	0-4	Silt loam	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	4-25	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0-2	75-95	65-80	60-80	55-75	40-64	14-34
	25-32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Nauvoo	0-12	Fine sandy loam	SM-SC, CL-ML, SC, CL	A-4	0-3	90-100	85-100	55-93	35-65	<30	NP-8
	12-34	Loam, sandy clay loam, clay loam.	SC, CL, ML	A-4, A-6, A-7	0-3	95-100	90-100	60-95	40-80	30-50	8-24
	34-46	Fine sandy loam, loam, sandy clay loam.	SM-SC, CL-ML, SC, CL	A-4, A-6	0-5	90-100	85-100	55-90	35-65	18-34	4-15
	46-60	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
41:*											
Townley----------	0-4	Silt loam--------	ML, CL, CL-ML	A-4	0-2	80-98	70-95	65-90	50-65	15-35	NP-10
	4-25	Silty clay loam, silty clay, clay.	CL, CH, ML, MH	A-6, A-7	0-2	75-95	65-80	60-80	55-75	40-64	14-34
	25-32	Weathered bedrock	---	---	---	---	---	---	---	---	---
Urban land.											
42--------------- Tupelo	0-8	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0	98-100	85-100	75-100	70-95	20-35	4-12
	8-15	Silty clay loam, silty clay, silt loam.	CL, CH	A-6, A-7	0	100	95-100	90-100	85-95	35-55	15-30
	15-55	Clay, silty clay, silty clay loam.	CH, MH, CL	A-7, A-6	0	95-100	95-100	90-100	75-98	32-70	11-40
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
43:*											
Tupelo----------	0-8	Silt loam--------	CL-ML, CL, ML	A-4, A-6	0	98-100	85-100	75-100	70-95	20-35	3-12
	8-55	Silty clay loam, silty clay, silt loam.	CL, CH	A-6, A-7	0	100	95-100	90-100	85-95	35-72	15-30
	55	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Urban land.											
44.*											
Urban land											

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated. The symbol < means less than; > means more than]

Map symbol and soil name	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
2	0-7	8-25	0.6-2.0	0.11-0.24	4.5-5.5	Low	0.32	3	.5-1
Albertville	7-59	35-55	0.2-0.6	0.12-0.22	4.5-5.5	Moderate	0.37		
	59-72	---	---	---	---	---	---		
3	0-7	6-25	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.24	5	.5-3
Allen	7-80	18-35	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
4	0-9	6-25	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.24	5	.5-3
Allen	9-80	18-35	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
5:*									
Allen	0-9	6-25	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.24	5	.5-3
	9-80	18-35	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.20		
Urban land.									
6:*									
Barfield	0-4	27-45	0.2-0.6	0.10-0.15	6.1-7.8	Moderate	0.17	1	.5-3
	4-11	35-60	0.2-0.6	0.09-0.14	6.1-7.8	High	0.17		
	11	---	---	---	---	---	---		
Rock outcrop.									
7:*									
Bodine	0-4	8-20	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	4-72	20-35	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
Fullerton	0-6	15-27	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
	6-35	23-35	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	35-65	40-60	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
Urban land.									
8:*									
Bodine	0-4	8-20	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	4-72	20-35	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
Birmingham	0-5	12-25	0.6-2.0	0.10-0.18	4.5-6.5	Low	0.24	3	<2
	5-29	18-35	0.6-2.0	0.10-0.17	4.5-6.5	Low	0.28		
	29-49	---	---	---	---	---	---		
	49	---	---	---	---	---	---		
9:*									
Bodine	0-4	8-20	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	4-72	20-35	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
Fullerton	0-6	15-27	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
	6-35	23-35	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	35-65	40-60	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
10, 11	0-7	15-40	0.6-2.0	0.18-0.20	4.5-6.0	Low	0.32	5	.5-1
Decatur	7-72	35-60	0.6-2.0	0.14-0.17	4.5-5.5	Moderate	0.32		
12:*									
Decatur	0-7	15-40	0.6-2.0	0.18-0.20	4.5-6.0	Low	0.32	5	.5-1
	7-72	35-60	0.6-2.0	0.14-0.17	4.5-5.5	Moderate	0.32		
Urban land.									
13*	0-4	7-21	0.6-2.0	0.12-0.22	4.5-6.0	Low	0.28	4	.5-2
Docena	4-40	18-35	0.6-2.0	0.16-0.24	4.5-6.0	Low	0.28		
	40-58	16-40	0.06-0.6	0.15-0.22	4.5-6.0	Moderate	0.32		
	58-65	---	---	---	---	---	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
14.* Dumps									
15 Etowah	0-6	15-27	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	.5-2
	6-65	23-35	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
16:* Etowah	0-6	15-27	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	.5-2
	6-65	23-35	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
Rock outcrop.									
17:* Fullerton	0-6	15-27	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
	6-35	23-35	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	35-65	40-60	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
Bodine	0-4	8-20	2.0-6.0	0.07-0.12	3.6-5.5	Low	0.28	5	.5-1
	4-72	20-35	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.28		
18:* Fullerton	0-6	15-27	0.6-2.0	0.10-0.16	4.5-5.5	Low	0.28	5	.5-2
	6-35	23-35	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.24		
	35-65	40-60	0.6-2.0	0.10-0.14	4.5-5.5	Moderate	0.20		
Urban land.									
19,* 20:* Gorgas	0-4	5-20	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.17	1	.5-2
	4-15	10-25	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.17		
	15	---	---	---	---	---	---		
Rock outcrop.									
21:* Gorgas	0-4	5-20	2.0-6.0	0.10-0.14	4.5-6.5	Low	0.17	1	.5-2
	4-15	10-25	2.0-6.0	0.08-0.15	4.5-5.5	Low	0.17		
	15	---	---	---	---	---	---		
Rock outcrop.									
Urban land.									
22 Hanceville	0-9	10-27	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.24	5	.5-1
	9-70	35-50	0.6-2.0	0.14-0.20	4.5-5.5	Moderate	0.28		
23:* Hanceville	0-9	10-27	0.6-2.0	0.14-0.20	4.5-5.5	Low	0.24	5	.5-1
	9-80	35-50	0.6-2.0	0.14-0.20	4.5-5.5	Moderate	0.28		
Urban land.									
24 Holston	0-6	10-25	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.32	5	.5-2
	6-65	18-35	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
25:* Holston	0-6	10-25	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.32	5	.5-2
	6-65	18-35	0.6-2.0	0.13-0.20	4.5-5.5	Low	0.32		
Urban land.									
26:* Ketona	0-6	25-50	0.6-2.0	0.14-0.20	6.1-8.4	Moderate	0.32	3	1-4
	6-50	35-60	0.06-0.2	0.12-0.18	6.1-8.4	High	0.32		
	50	---	---	---	---	---	---		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
26:*									
Sullivan----------	0-24	10-25	0.6-2.0	0.12-0.20	5.1-7.3	Low------------	0.32	5	1-3
	24-60	27-45	0.6-2.0	0.09-0.14	5.1-7.3	Low------------	0.32		
27:*									
Leesburg----------	0-4	5-18	2.0-6.0	0.08-0.16	4.5-5.5	Low------------	0.24	5	<2
	4-40	18-30	0.6-2.0	0.09-0.18	4.5-5.5	Low------------	0.32		
	40-66	20-40	0.6-2.0	0.12-0.18	4.5-5.5	Low------------	0.32		
Rock outcrop.									
28:*									
Montevallo--------	0-6	7-27	0.6-2.0	0.09-0.18	4.5-6.0	Low------------	0.37	2	.5-2
	6-16	15-35	0.6-2.0	0.08-0.12	4.5-6.0	Low------------	0.32		
	16-36	---	---	---	---	---------------	----		
Nauvoo------------	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
Urban land.									
29:*									
Montevallo--------	0-6	7-27	0.6-2.0	0.09-0.18	4.5-6.0	Low------------	0.37	2	.5-2
	6-16	15-35	0.6-2.0	0.08-0.12	4.5-6.0	Low------------	0.32		
	16-36	---	---	---	---	---------------	----		
Nauvoo------------	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
30, 31------------ Nauvoo	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
32,* 33:*									
Nauvoo------------	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
Urban land.									
34:*									
Nauvoo------------	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
Montevallo--------	0-6	7-27	0.6-2.0	0.09-0.18	4.5-6.0	Low------------	0.37	2	.5-2
	6-16	15-35	0.6-2.0	0.02-0.12	4.5-6.0	Low------------	0.32		
	16-36	---	---	---	---	---------------	----		
35*--------------- Palmerdale	0-6	10-35	2.0-6.0	0.04-0.10	3.6-5.5	Low------------	0.24	5	<.5
	6-60	10-35	2.0-6.0	0.04-0.10	3.6-5.5	Low------------	0.24		
36.* Pits									
37:*									
Sullivan----------	0-25	10-25	0.6-2.0	0.12-0.20	5.1-7.3	Low------------	0.32	5	1-3
	25-60	15-25	0.6-2.0	0.09-0.14	5.1-7.3	Low------------	0.32		
Ketona------------	0-6	25-50	0.6-2.0	0.14-0.20	6.1-8.4	Moderate--------	0.32	3	1-4
	6-50	35-60	0.06-0.2	0.12-0.18	6.1-8.4	High-----------	0.32		
	50	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Map symbol and soil name	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
38*:									
Sullivan--------	0-25	10-25	0.6-2.0	0.12-0.20	5.1-7.3	Low------------	0.32	5	1-3
	25-60	15-25	0.6-2.0	0.09-0.14	5.1-7.3	Low------------	0.32		
Ketona----------	0-6	25-50	0.6-2.0	0.14-0.20	6.1-8.4	Moderate-------	0.32	3	1-4
	6-50	35-60	0.06-0.2	0.12-0.18	6.1-8.4	High-----------	0.32		
	50	---	---	---	---	---------------	----		
Urban land.									
39:*									
Sullivan--------	0-39	10-25	0.6-2.0	0.12-0.20	5.1-7.3	Low------------	0.32	5	1-3
	39-66	15-25	0.6-2.0	0.09-0.14	5.1-7.3	Low------------	0.32		
State-----------	0-9	5-15	0.6-6.0	0.10-0.20	4.5-5.5	Low------------	0.28	4	<2
	9-40	18-34	0.6-2.0	0.14-0.19	4.5-5.5	Low------------	0.28		
	40-60	2-15	>2.0	0.02-0.10	4.5-6.0	Low------------	0.17		
40:*									
Townley---------	0-4	10-27	0.6-2.0	0.12-0.14	4.5-5.5	Low------------	0.37	3	<1
	4-25	35-60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate-------	0.28		
	25-32	---	---	---	---	---------------	----		
Nauvoo----------	0-12	10-20	2.0-6.0	0.13-0.17	4.5-5.5	Low------------	0.28	3	.5-2
	12-34	18-35	0.6-2.0	0.14-0.20	4.5-5.5	Low------------	0.32		
	34-46	15-30	0.6-2.0	0.11-0.17	4.5-5.5	Low------------	0.32		
	46-60	---	---	---	---	---------------	----		
41:*									
Townley---------	0-4	10-27	0.6-2.0	0.12-0.14	4.5-5.5	Low------------	0.37	3	<1
	4-25	35-60	0.06-0.2	0.12-0.18	4.5-5.5	Moderate-------	0.28		
	25-32	---	---	---	---	---------------	----		
Urban land.									
42--------------- Tupelo	0-8	18-32	0.6-2.0	0.18-0.22	4.5-6.0	Low------------	0.37	4	.5-2
	8-55	35-65	0.06-0.2	0.12-0.16	5.1-8.4	High-----------	0.28		
	55	---	---	---	---	---------------	----		
43:*									
Tupelo----------	0-8	18-32	0.6-2.0	0.18-0.22	4.5-6.0	Low------------	0.37	4	.5-2
	8-55	35-65	0.6-2.0	0.17-0.21	4.5-6.0	Moderate-------	0.32		
	55	---	---	---	---	---------------	----		
Urban land.									
44.*									
Urban land									

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain terms such as "brief" and "apparent." Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
2------------------ Albertville	C	None--------	---	---	>6.0	---	---	40-60	Soft	Moderate	High.
3, 4--------------- Allen	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
5:*											
Allen------------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Urban land.											
6:*											
Barfield---------	D	None--------	---	---	>6.0	---	---	8-20	Hard	High-----	Low.
Rock outcrop.											
7:*											
Bodine-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Fullerton--------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Urban land.											
8:*											
Bodine-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Birmingham-------	B	None--------	---	---	>6.0	---	---	20-40	Soft	Moderate	Moderate.
9:*											
Bodine-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.
Fullerton--------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
10, 11------------ Decatur	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
12:*											
Decatur----------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Urban land.											
13*--------------- Docena	C	None--------	---	---	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Moderate.
14.* Dumps											
15---------------- Etowah	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
16:*											
Etowah-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	Moderate.
Rock outcrop.											
17:*											
Fullerton--------	B	None--------	---	---	>6.0	---	---	>60	---	High-----	Moderate.
Bodine-----------	B	None--------	---	---	>6.0	---	---	>60	---	Low------	High.

See footnotes at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In			
18:*											
Fullerton	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Urban land.											
19,* 20:*											
Gorgas	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Rock outcrop.											
21:*											
Gorgas	D	None	---	---	>6.0	---	---	10-20	Hard	Low	Moderate.
Rock outcrop.											
Urban land.											
22 Hanceville	B	None	---	---	>6.0	---	---	>60	---	High	High.
23:*											
Hanceville	B	None	---	---	>6.0	---	---	>60	---	High	High.
Urban land.											
24 Holston	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
25:*											
Holston	B	None	---	---	>6.0	---	---	>60	---	Moderate	High.
Urban land.											
26:*											
Ketona**	D	None	---	---	+2-1.0	Apparent	Dec-Apr	40-72	Hard	High	Moderate.
Sullivan	B	Frequent	Brief	Dec-Mar	4.0-6.0	Apparent	Dec-Mar	>60	---	Low	Low.
27:*											
Leesburg	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Rock outcrop.											
28:*											
Montevallo	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Urban land.											
29:*											
Montevallo	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.
Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
30, 31 Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
32,* 33:*											
Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Urban land.											
34:*											
Nauvoo	B	None	---	---	>6.0	---	---	40-60	Soft	Low	High.
Montevallo	D	None	---	---	>6.0	---	---	10-20	Soft	Moderate	Moderate.

See footnotes at end of table.

TABLE 16.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In			
35*----------------- Palmerdale	B	None---------	---	---	>6.0	---	---	>60	---	Moderate	High.
36.* Pits											
37:* Sullivan----------	B	Frequent----	Brief------	Dec-Mar	4.0-6.0	Apparent	Dec-Apr	>60	---	Low-------	Low.
Ketona------------	D	Frequent----	Brief------	Dec-Apr	0.5-1.0	Apparent	Dec-Apr	40-72	Hard	High------	Moderate.
38:* Sullivan----------	B	Frequent----	Brief------	Dec-Mar	4.0-6.0	Apparent	Dec-Apr	>60	---	Low-------	Low.
Ketona------------	D	Frequent----	Brief------	Dec-Apr	0.5-1.0	Apparent	Dec-Apr	40-72	Hard	High------	Moderate.
Urban land.											
39:* Sullivan----------	B	Frequent----	Brief------	Dec-Mar	4.0-6.0	Apparent	Dec-Mar	>60	---	Low-------	Low.
State-------------	B	Occasional	Brief------	Dec-Jun	4.0-6.0	Apparent	Dec-Mar	>60	---	Moderate	High.
40:* Townley-----------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Nauvoo------------	B	None---------	---	---	>6.0	---	---	40-60	Soft	Low-------	High.
41:* Townley-----------	C	None---------	---	---	>6.0	---	---	20-40	Soft	Moderate	High.
Urban land.											
42----------------- Tupelo	D	None---------	---	---	1.0-2.0	Apparent	Nov-Mar	40-70	Hard	High------	Moderate.
43:* Tupelo------------	D	None---------	---	---	1.0-2.0	Apparent	Nov-Mar	40-70	Hard	High------	Moderate.
Urban land.											
44.* Urban land											

* See description of the map unit for composition and behavior characteristics of the map unit.

** In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 17.--CHEMICAL ANALYSES OF SELECTED SOILS

[Absence of an entry indicates that the analysis was not made]

Soil series and laboratory number	Horizon	Depth	Reaction 1:1 (soil to water)	Extractable bases-- Calcium	Magnesium	Potassium	Base saturation
		In	pH	Milliequivalents per 100 grams			Pct
Birmingham:							
S77AL-73-14-1----	A1	0-5	6.5	---	---	---	---
S77AL-73-14-2----	B2t	5-29	5.0	2.7	0.9	0.2	38
Docena:							
S78AL-73-27-1----	A1	0-4	6.2	13.59	4.48	0.17	38
S78AL-73-27-2----	B21t	4-26	4.5	0.49	0.36	0.04	14
S78AL-73-27-3----	B22t	26-40	4.7	0.37	0.63	0.06	16
S78AL-73-27-4----	IIB23t	40-58	5.2	0.37	1.45	0.07	21
S78AL-73-27-5----	IIC	58-65	5.1	0.38	1.01	0.12	24
Hanceville:							
S77AL-73-16-1----	A1	0-5	6.2	---	---	---	---
S77AL-73-16-3----	B2t	9-70	4.9	1.3	1.3	0.2	25
Ketona:							
S76AL-73-7-1-----	Ap	0-6	7.1	14.12	17.54	0.12	93
S76AL-73-7-2-----	B21tg	6-30	7.7	13.02	18.40	0.05	94
S76AL-73-7-3-----	B22tg	30-50	7.9	1.70	17.54	0.05	91
Sullivan:							
S78AL-73-28-1----	Ap	0-4	6.7	8.94	3.49	0.15	85
S78AL-73-28-2----	B21	4-20	6.3	4.39	1.03	0.17	69
S78AL-73-28-3----	B22	20-39	6.3	8.29	1.17	0.04	75
S78AL-73-28-4----	C1	39-66	6.4	5.34	0.68	0.03	70
Tupelo:							
S76AL-73-13-1----	A1	0-8	5.3	2.90	1.80	0.05	60
S76AL-73-13-2----	B1	8-14	5.7	5.20	0.98	0.04	66
S76AL-73-13-3----	B21t	14-23	5.8	6.20	1.80	0.05	69
S76AL-73-13-4----	B22t	23-55	5.5	7.25	2.62	0.08	60

TABLE 18.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil series and laboratory number	Horizon	Depth	Particle size distribution (Percent less than 2mm) Total clay (<0.002 mm)	Total silt (0.05-0.002 mm)	Total sand (2.0-0.05 mm)
Birmingham:					
S77AL-73-14-1------	A1	0-5	21.7	34.5	43.8
S77AL-73-14-2------	B2t	5-29	31.7	28.0	40.3
Docena:					
S78AL-73-27-1------	A1	0-4	8.9	78.9	12.2
S78AL-73-27-2------	B21t	4-26	17.9	79.6	2.5
S78AL-73-27-3------	B22t	26-40	23.8	73.3	2.9
S78AL-73-27-4------	IIB23t	40-58	28.8	66.7	4.5
S78AL-73-27-5------	IIC	58-65	32.0	59.4	8.6
Hanceville:					
S77AL-73-16-1------	A1	0-5	8.3	33.5	58.2
S77AL-73-16-3------	B2t	9-70	47.6	21.5	30.9
Ketona:					
S76AL-73-7-1-------	Ap	0-6	32.5	51.0	16.5
S76AL-73-7-2-------	B21tg	6-30	46.4	41.6	12.0
S76AL-73-7-3-------	B22tg	30-50	44.2	40.6	15.2
Sullivan:					
S78AL-73-28-1------	Ap	0-4	9.2	61.6	29.2
S78AL-73-28-2------	B21	4-20	15.4	55.6	29.0
S78AL-73-28-3------	B22	20-39	21.1	37.6	41.3
S78AL-73-28-4------	C1	39-66	12.4	18.8	68.8
Tupelo:					
S76AL-73-13-1------	A1	0-8	16.3	72.2	11.5
S76AL-73-13-2------	B1	8-14	30.7	53.6	15.7
S76AL-73-13-3------	B21t	14-23	44.3	44.8	10.9
S76AL-73-13-4------	B22t	23-55	59.9	30.0	10.1

TABLE 19.--ENGINEERING INDEX TEST DATA

[Absence of an entry indicates data were not available. NP means nonplastic]

Soil name,[1] report number, horizon, and depth in inches	Classification		Grain-size distribution								Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--							Percentage smaller than .005 mm				
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200				Max. dry density	Optimum moisture
											Pct		Lb/ft[3]	Pct
Albertville silt loam: (S75AL-073-004)														
Ap-----------0-7	A-4	ML	100	100	100	99	96	94	75	24	26	1	102	15
B21t---------10-32	A-7-5	MH	100	100	100	100	100	98	94	74	65	32	95	23
B22t---------32-59	A-7-5	MH	100	100	100	100	100	100	99	84	69	38	99	19
Birmingham cobbly loam: (S77AL-073-014)														
A1-----------0-5	A-2-4	GM-GC	89	--	--	44	39	37	30	17	--	NP	109	16
B2t----------5-29	A-4	SC	93	--	--	67	63	60	39	26	27	10	126	13
Decatur silt loam: (S77AL-073-020)														
Ap-----------0-7	A-4	ML	100	100	100	99	96	92	77	33	25	2	100	17
B2t----------7-72	A-7-6	ML	100	100	100	99	97	93	84	59	42	16	104	16
Etowah loam: (S77AL-073-018)														
Ap-----------0-6	A-4	ML	100	100	100	95	92	87	60	30	30	6	100	17
B21t---------6-52	A-6	CL	100	100	100	99	97	91	72	47	34	12	109	16
B22t---------52-65	A-4	CL	100	100	100	99	98	94	66	39	30	10	114	14
Hanceville fine sandy loam: (S77AL-073-016)														
A1-----------0-5	A-4	ML	100	100	100	99	98	97	54	25	--	NP	97	17
B1-----------5-9	A-4	ML	100	100	100	99	99	98	54	29	--	NP	118	10
B21t---------9-70	A-7-5	ML	100	100	100	99	99	99	74	58	43	18	104	20
Ketona silty clay loam: (S76AL-073-007)														
A1-----------0-6	A-7-5	ML	100	100	100	100	100	95	87	63	48	15	93	20
B21tg--------6-30	A-7-5	CL	100	100	100	92	91	86	81	62	49	16	99	21
Nauvoo fine sandy loam: (S77AL-073-019)														
A11----------0-4	A-4	SM	100	100	100	97	94	93	56	21	27	2	100	16
B21t---------12-24	A-7-5	ML	100	100	100	97	96	95	74	54	50	19	99	22
State silt loam: (S77AL-073-021)														
Ap-----------0-4	A-4	ML	100	100	100	100	100	99	84	51	34	4	94	20
B21t---------4-25	A-4	CL	100	100	100	99	99	98	78	47	29	10	111	15

See footnote at end of table.

TABLE 19.--ENGINEERING INDEX TEST DATA--Continued

Soil name,[1] report number, horizon, and depth in inches	Classification		Grain-size distribution								Liquid limit	Plasticity index	Moisture density	
			Percentage passing sieve--							Percentage smaller than .005 mm				
	AASHTO	Unified	2 inch	3/4 inch	3/8 inch	No. 4	No. 10	No. 40	No. 200				Max. dry density	Optimum moisture
											Pct		Lb/ft3	Pct
Tupelo silt loam: (S76AL-073-013)														
A1------------0-8	A-4	ML	100	100	100	99	97	90	88	50	26	3	105	16
B21t---------14-23	A-7-6	CH	100	100	100	100	100	93	91	77	57	29	101	20
B22t---------23-55	A-7-5	CH	100	100	100	100	100	97	94	82	72	29	98	18

1 Refer to "Soil series and their morphology" for location of pedon.

TABLE 20.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Albertville	Clayey, mixed, thermic Typic Hapludults
Allen	Fine-loamy, siliceous, thermic Typic Paleudults
Barfield	Clayey, mixed, thermic Lithic Hapludolls
Birmingham	Loamy-skeletal, oxidic, thermic Typic Hapludalfs
Bodine	Loamy-skeletal, siliceous, thermic Typic Paleudults
Decatur	Clayey, kaolinitic, thermic Rhodic Paleudults
Docena	Fine-silty, siliceous, thermic Aquic Hapludults
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Fullerton	Clayey, kaolinitic, thermic Typic Paleudults
Gorgas	Loamy, siliceous, thermic Lithic Hapludults
Hanceville	Clayey, mixed, thermic Typic Rhodudults
Holston	Fine-loamy, siliceous, thermic Typic Paleudults
Ketona	Fine, mixed, thermic Vertic Ochraqualfs
Leesburg	Fine-loamy, siliceous, thermic Typic Paleudults
Montevallo	Loamy-skeletal, mixed, thermic, shallow Typic Dystrochrepts
Nauvoo	Fine-loamy, siliceous, thermic Typic Hapludults
Palmerdale	Loamy-skeletal, mixed, acid, thermic Typic Udorthents
State	Fine-loamy, mixed, thermic Typic Hapludults
Sullivan	Fine-loamy, siliceous, thermic Dystric Fluventic Eutrochrepts
Townley	Clayey, mixed, thermic Typic Hapludults
Tupelo	Fine, mixed, thermic Aquic Hapludalfs

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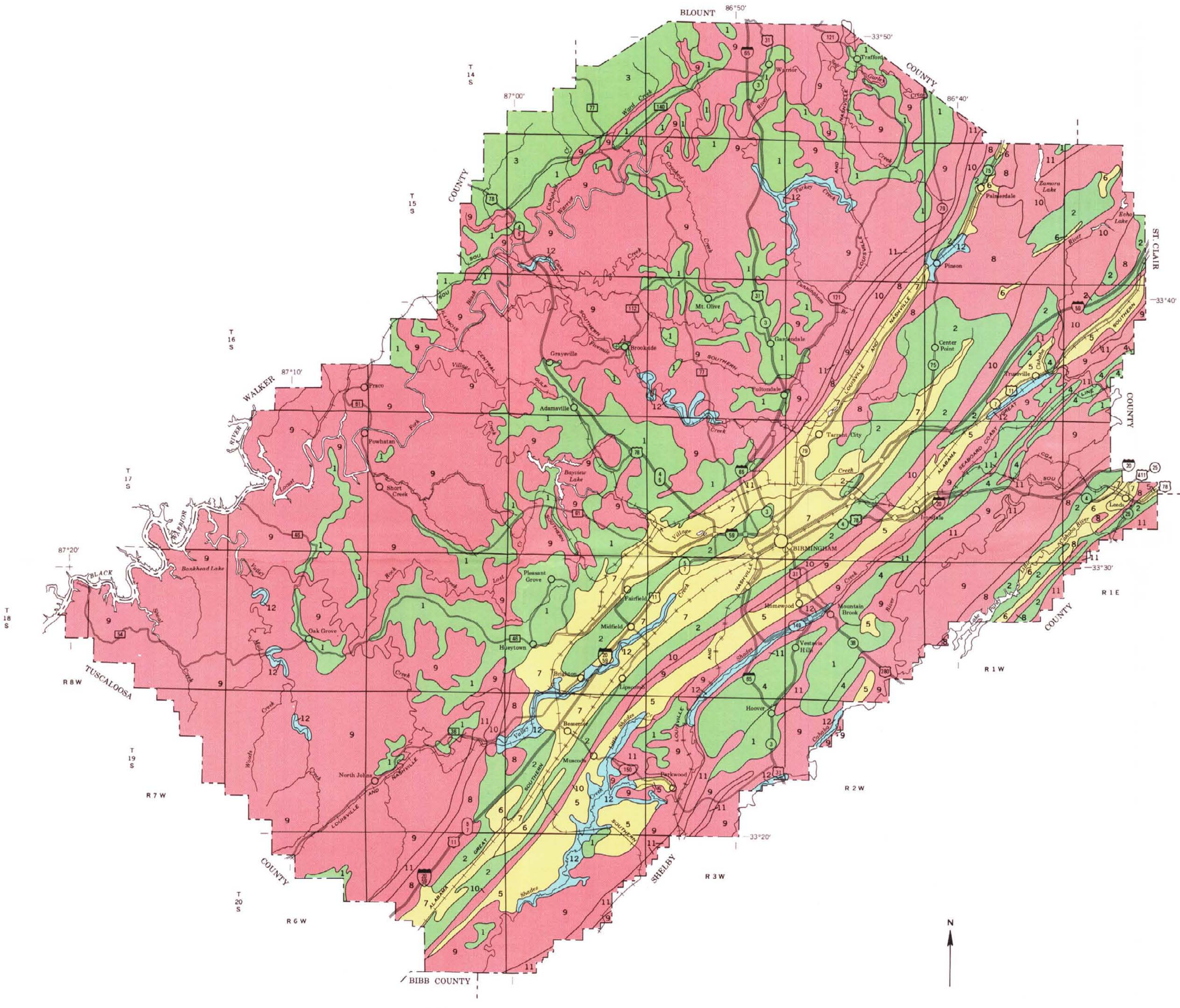

LEGEND

UNDULATING TO HILLY SOILS ON PLATEAUS, MOUNTAINS AND RIDGES

1	Nauvoo-Townley-Montevallo: Well drained soils that are moderately and slowly permeable; formed in residuum from sandstone, siltstone, and shale
2	Fullerton-Bodine-Urban land: Well and somewhat excessively drained soils that are moderately and moderately rapidly permeable and Urban land; soils formed in residuum from cherty limestone
3	Nauvoo-Allen-Gorgas: Well drained soils that are moderately and moderately rapidly permeable; formed in residuum from sandstone and alluvium and colluvium
4	Gorgas-Nauvoo-Urban land: Well drained soils that are moderately rapidly and moderately permeable and Urban land; soils formed in residuum from sandstone

UNDULATING TO ROLLING SOILS IN VALLEYS

5	Holston-Townley-Urban land: Well drained soils that are moderately and slowly permeable and Urban land; soils formed in alluvium and colluvium and in residuum from shale and siltstone
6	Etowah-Decatur-Sullivan: Well drained soils that are moderately permeable; formed in cherty alluvium and colluvium, cherty limestone residuum, and noncherty alluvium
7	Urban land-Tupelo-Decatur: Urban land and moderately well and well drained soils that are slowly and moderately permeable; soils formed in cherty limestone colluvium or residuum

STEEP SOILS ON MOUNTAINS, DISSECTED PLATEAUS, AND VALLEY SIDES

8	Bodine-Fullerton: Somewhat excessively drained and well drained soils that are moderately rapidly and moderately permeable; formed in residuum from cherty limestone
9	Montevallo-Nauvoo: Well drained soils that are moderately permeable; formed in residuum from shale, siltstone, and sandstone
10	Bodine-Birmingham: Somewhat excessively drained and well drained soils that are moderately rapidly and moderately permeable; formed in residuum from cherty limestone, ironstone, and red sandstone
11	Leesburg-Gorgas: Well drained soils that are moderately and moderately rapidly permeable; formed in residuum from sandstone and in colluvium

NEARLY LEVEL SOILS ON FLOOD PLAINS

12	Sullivan-State: Well drained soils that are moderately permeable; formed in recent alluvium

Compiled 1981

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

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SOIL CONSERVATION SERVICE
ALABAMA AGRICULTURAL EXPERIMENT STATION
ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES
ALABAMA SURFACE MINING RECLAMATION COMMISSION
U.S. DEPARTMENT OF INTERIOR, BUREAU OF LAND MANAGEMENT

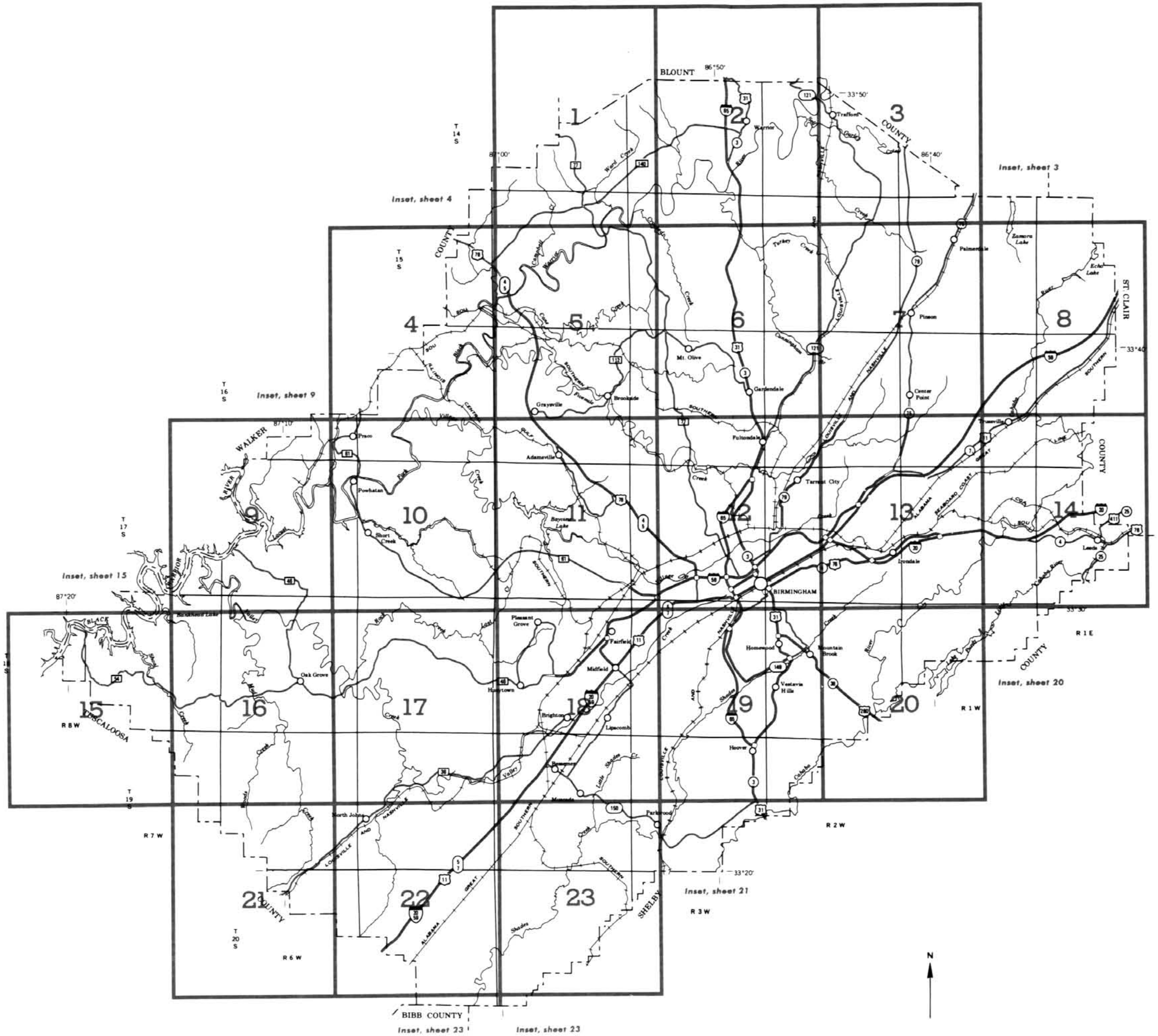
GENERAL SOIL MAP

JEFFERSON COUNTY, ALABAMA

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS

JEFFERSON COUNTY, ALABAMA

Scale 1:253,440

1 0 1 2 3 4 Miles

1 0 4 8 Km

SOIL LEGEND

Publication map symbols are numeric and in alphabetic order. Names without slope designation are miscellaneous areas.

Soil names with a 1/ superscript after the name are mapped in broad delineations at less intensity (order 3) than the remainder of the units in the county. The superscript will not be used in the manuscript but the units will be described to reflect their nature.

SYMBOL	NAME
2	Albertville silt loam, 2 to 6 percent slopes
3	Allen fine sandy loam, 2 to 6 percent slopes
4	Allen fine sandy loam, 8 to 15 percent slopes
5	Allen-Urban land complex, 8 to 15 percent slopes
6	Barfield-Rock outcrop complex, steep
7	Bodine-Fullerton-Urban land complex, steep
8	Bodine-Birmingham association, steep 1/
9	Bodine-Fullerton association, steep 1/
10	Decatur silt loam, 2 to 8 percent slopes
11	Decatur silt loam, 8 to 15 percent slopes
12	Decatur-Urban land complex, 2 to 8 percent slopes
13	Docena complex, 0 to 4 percent slopes
14	Dumps
15	Etowah loam, 2 to 8 percent slopes
16	Etowah-Rock outcrop complex, 2 to 8 percent slopes
17	Fullerton-Bodine complex, 8 to 15 percent slopes
18	Fullerton-Urban land complex, 8 to 15 percent slopes
19	Gorgas-Rock outcrop complex, 8 to 15 percent slopes
20	Gorgas-Rock outcrop complex, steep
21	Gorgas-Rock outcrop-Urban land complex, 8 to 15 percent slopes
22	Hanceville fine sandy loam, 8 to 15 percent slopes
23	Hanceville-Urban land complex, 2 to 8 percent slopes
24	Holston loam, 2 to 8 percent slopes
25	Holston-Urban land complex, 2 to 8 percent slopes
26	Ketona-Sullivan complex, 0 to 4 percent slopes
27	Leesburg-Rock outcrop complex, steep 1/
28	Montevallo-Nauvoo-Urban land complex, steep
29	Montevallo-Nauvoo association, steep 1/
30	Nauvoo fine sandy loam, 2 to 8 percent slopes
31	Nauvoo fine sandy loam, 8 to 15 percent slopes
32	Nauvoo-Urban land complex, 2 to 8 percent slopes
33	Nauvoo-Urban land complex, 8 to 15 percent slopes
34	Nauvoo-Montevallo association, steep 1/
35	Palmerdale complex, steep 1/
36	Pits
37	Sullivan-Ketona complex, 0 to 2 percent slopes
38	Sullivan-Ketona-Urban land complex, 0 to 2 percent slopes
39	Sullivan-State complex, 0 to 2 percent slopes
40	Townley-Nauvoo complex, 8 to 15 percent slopes
41	Townley-Urban land complex, 8 to 15 percent slopes
42	Tupelo silt loam, 0 to 4 percent slopes
43	Tupelo-Urban land complex, 0 to 4 percent slopes
44	Urban land

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label) — Hedley Airstrip

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — 4, 5

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

1 ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10 000 Feet
Scale 1:24 000

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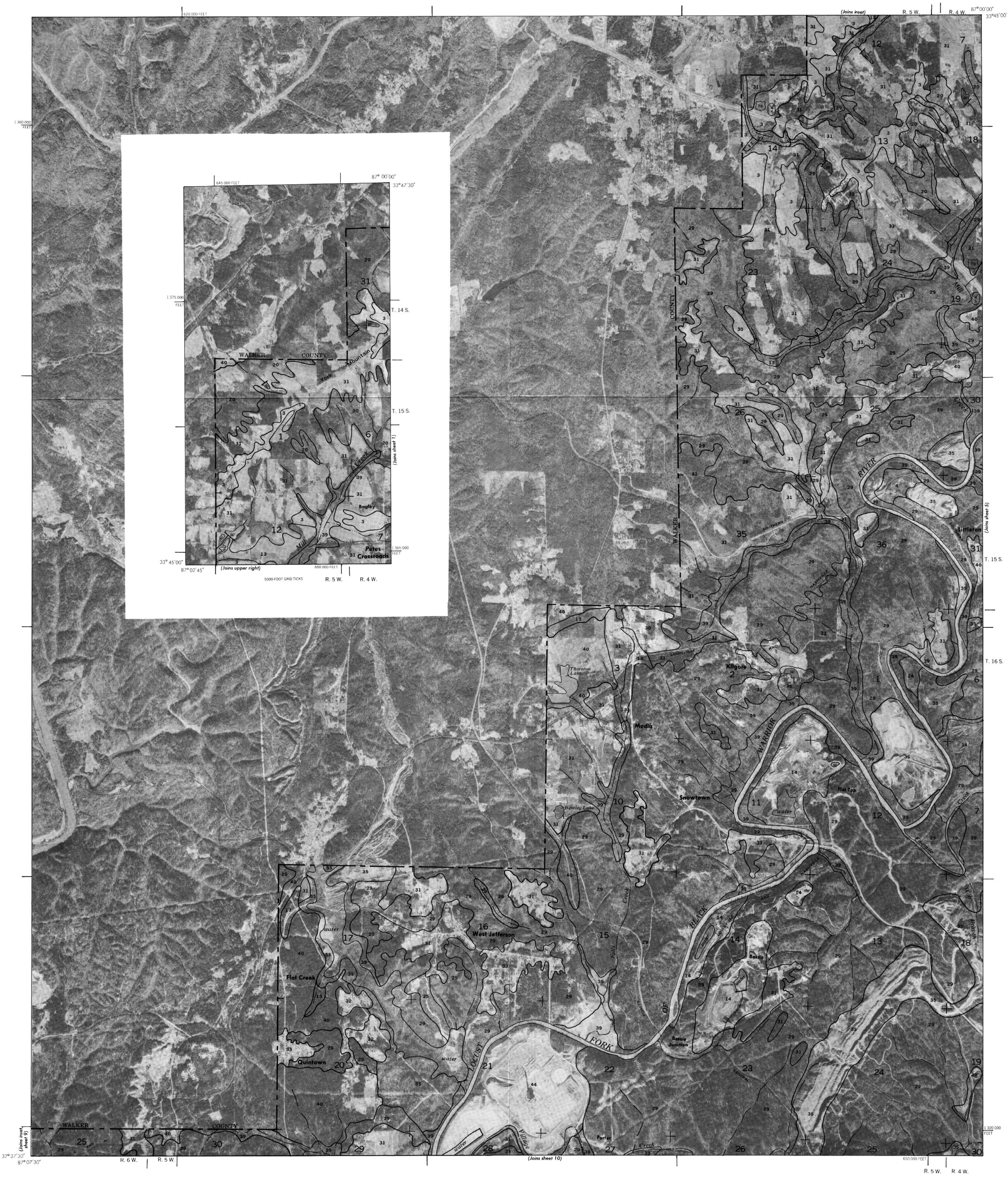

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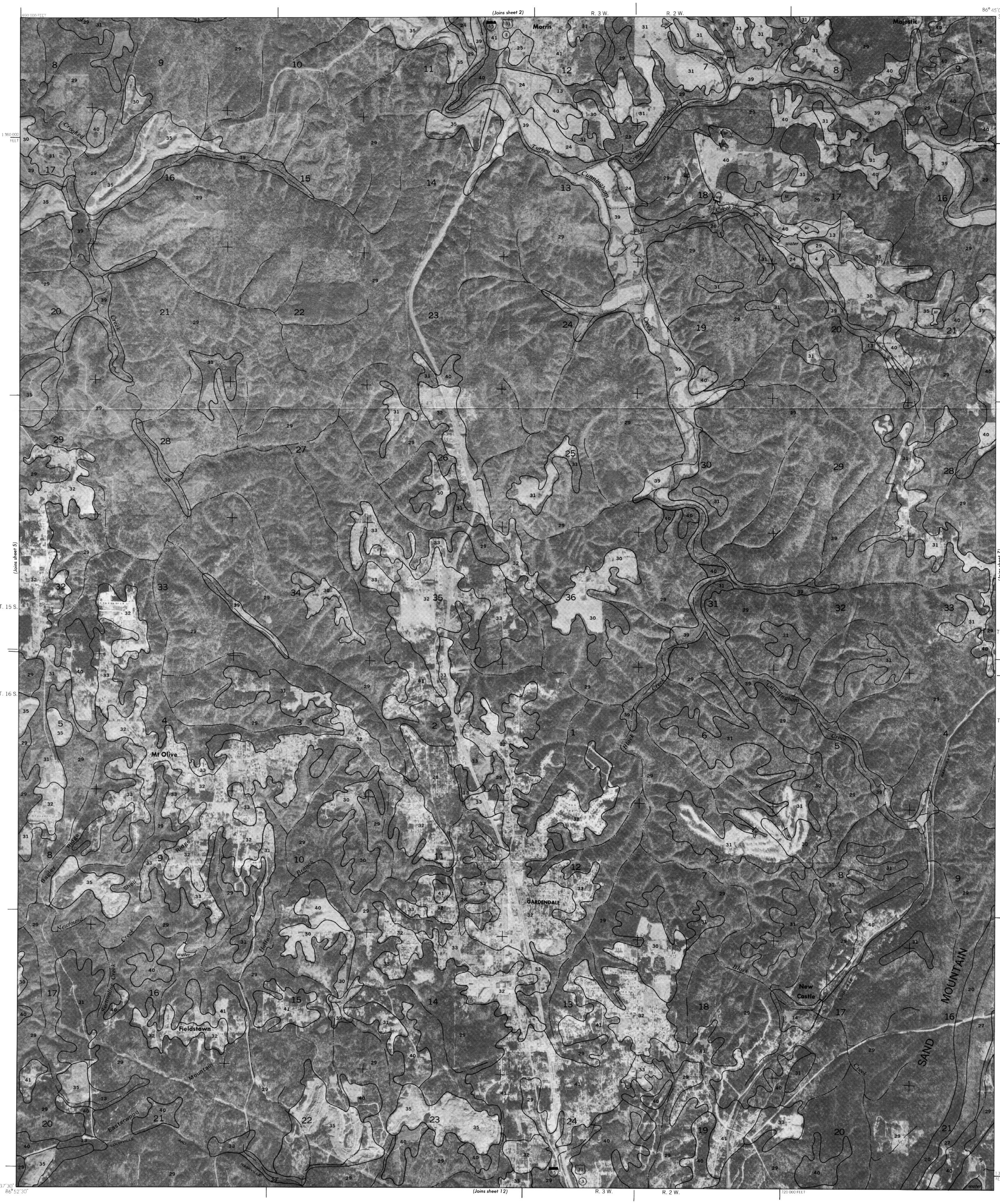

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JEFFERSON COUNTY, ALABAMA

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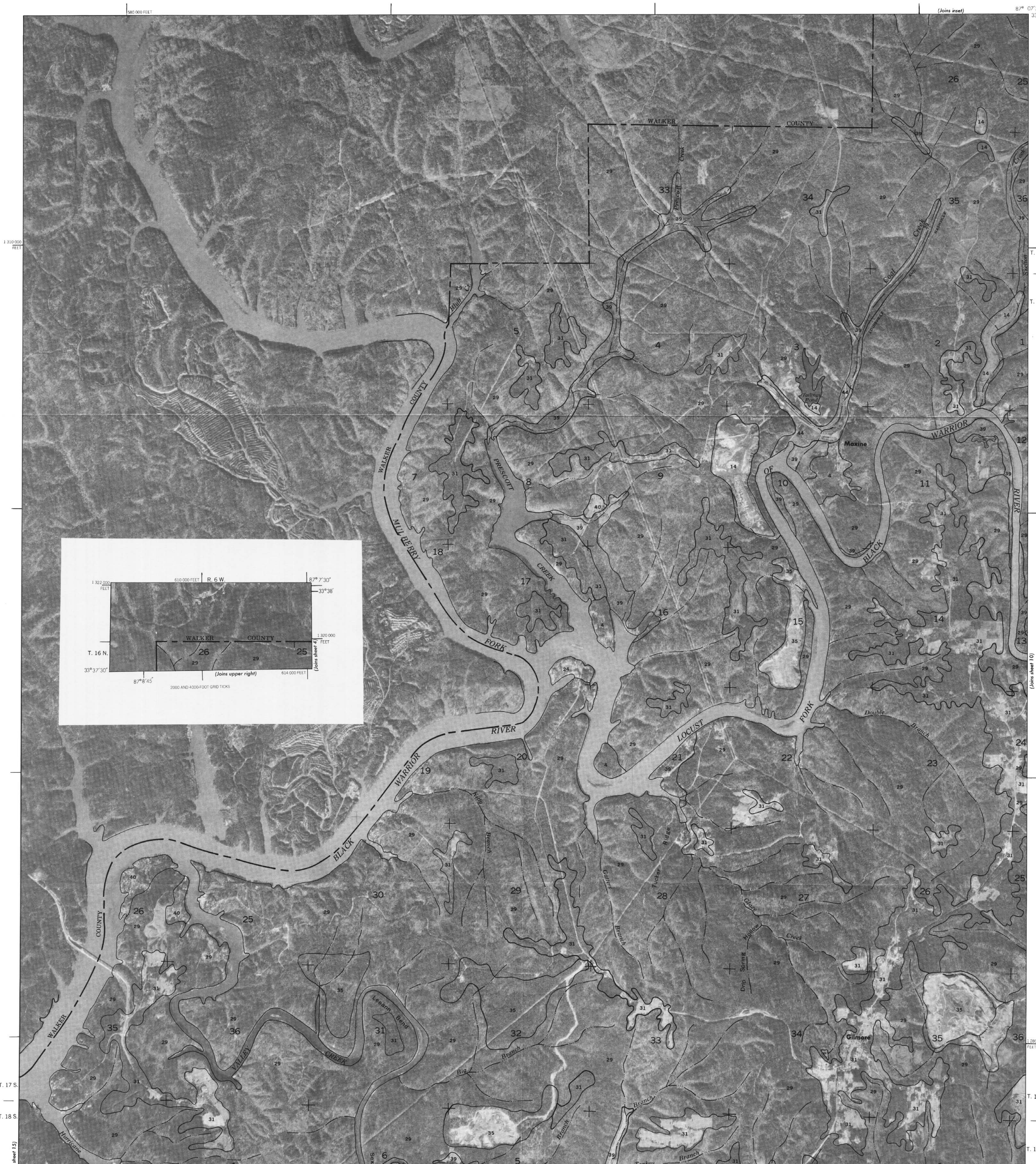

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1 ¾ ½ ¼ 0 1 2 Miles

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SHEET NUMBER 11
JEFFERSON COUNTY, ALABAMA

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Scale 1:24000

JEFFERSON COUNTY, ALABAMA NO. 11

Scale 1:24000

1 ¾ ½ ¼ 0 1 2 Miles

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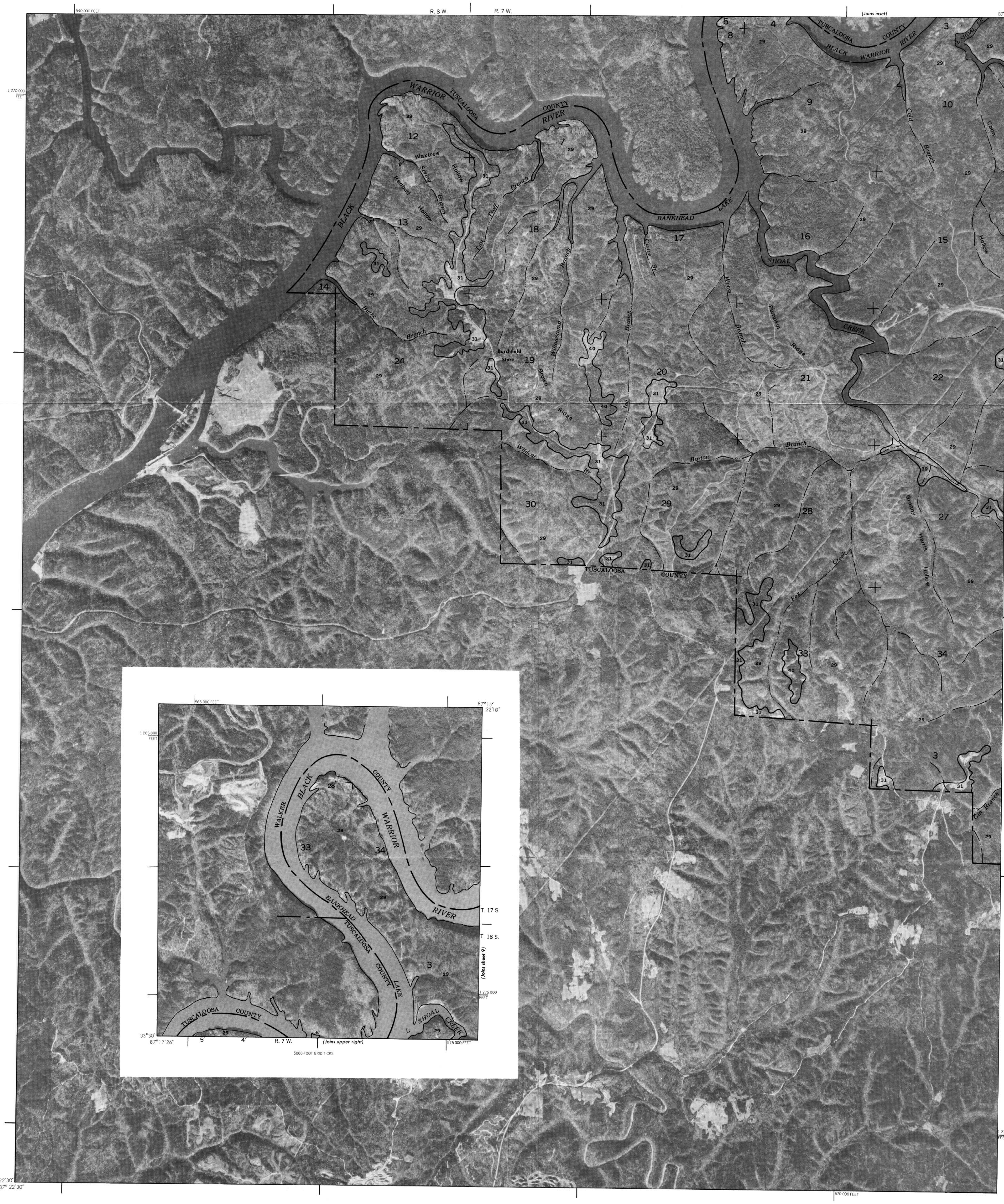

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Scale 1:24000

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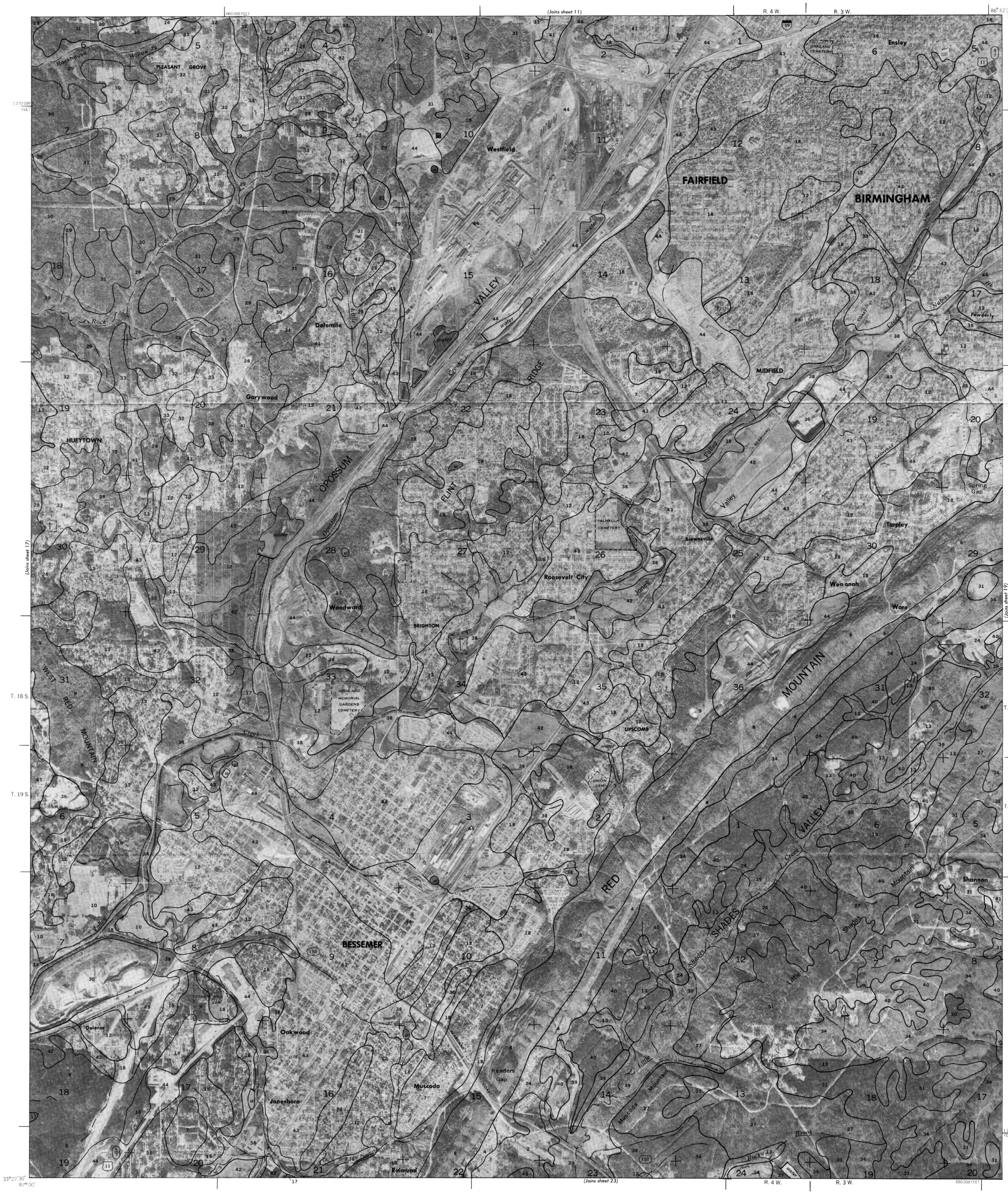

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Scale 1:24000

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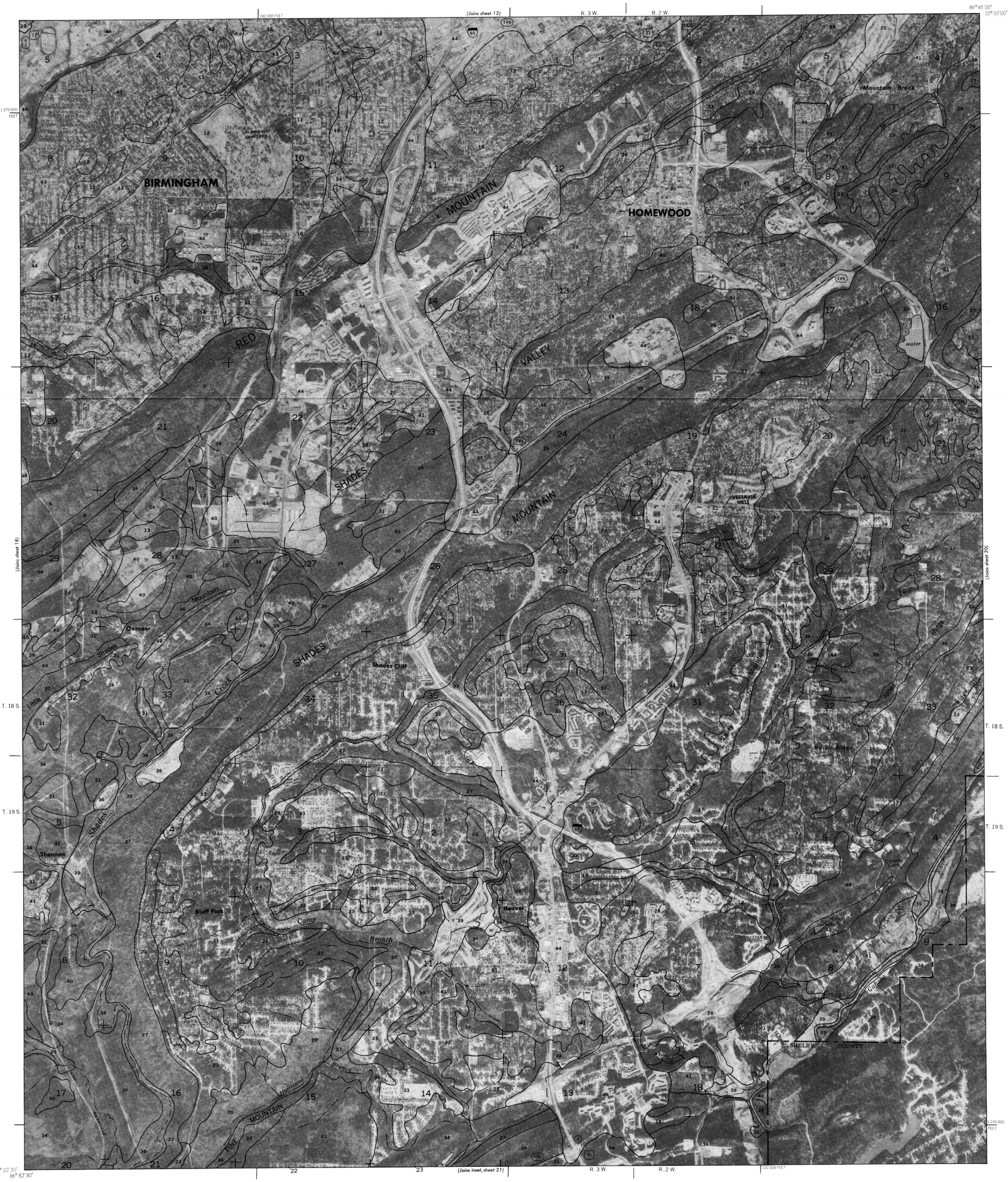
JEFFERSON COUNTY, ALABAMA



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Scale 1:24000

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1 ¾ ½ ¼ 0 1 2 Miles
5000 4000 3000 2000 1000 0 5000 10000 Feet
Scale 1:24000